CCD-V30E

SERVICE MANUAL



AEP Model
E Model
UK Model
Australian Model

Handycam Video 8

SPECIFICATIONS

System

Video recording system	Rotary two heads, Helical scanning FM system
Audio recording system	Rotary head, FM system
Video signal	PAL colour, CCIR standards
Usable cassette	8mm video format cassette
Tape speed	SP: Approx. 20.051 mm/sec. LP: Approx. 10.058 mm/sec.
Recording or playback time	SP: 90 min. (P5–90) LP: 180 min. (P5–90)
Fast forward time	Approx. 4 min. 10 sec. (P5–60)
Image device	CCD (Charge Coupled Device)
Viewfinder	Electric viewfinder VF-240/241 (0.7″ black and white)
Lens	Combined 2.5 × manual zoom lens f = 12–30 mm, F1.6 with macro Filter diameter: 46 mm
Auto focus system	Infrared autofocus
Colour temperature	Preset values: ☀ 5,800K ⁂ 3,200K Auto: From the light at a tungsten lamp to the light on a slightly overcast day.
Minimum illumination	19 lux
Illumination range	19 lux–100,000 lux (1.8–9,294 footcandles)
Recommended illumination	More than 300 lux (28 footcandles)
Aperture correction	Automatic

Input and output connector

Video output	Phono jack, 1 Vp-p, 75 ohms unbalanced sync negative
Audio output	Phono jack, −10dBs, at output impedance less than 2.2 kilohms
RFU DC OUT	Special minijack, 5V DC, for the RFU-88E/AS/UK only
MIC jack	Minijack, −66 dBs, low impedance With 2.5–3 V DC output, impedance 6.8 kilohms
Microphone power output jack	Special minijack, 5 V DC

Display in the viewfinder

Mode and caution indicators
Mode: REC/STBY
INDOOR/OUTDOOR
BACK LIGHT
Caution: BATTERY
DEW
TAPE END
CASSETTE
LOW LIGHT
CAUTION

— Continued on next page —

MICROFILM

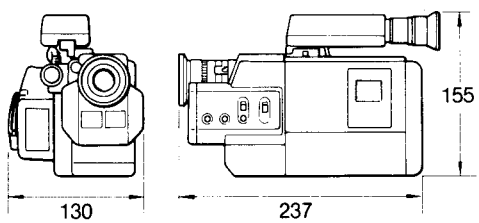
VIDEO

VIDEO CAMERA RECORDER

SONY®

General

Power requirements	Battery compartment 6 V/8.5 V
Power consumption	7.0W (camera recording) including the viewfinder
Installation	Vertically
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	−20°C to +60°C (−4°F to +140°F)
Dimensions	Approx. 130 × 155 × 237 mm (w/h/d) ($5^1/_8$ × $6^1/_8$ × $9^3/_8$ in.)



Weight	Approx. 1.4 kg (3 lb 2 oz) excluding the battery and cassette
Microphone	Electret condenser microphone, omni-directional monaural type

Optional accessories

Carrying case LC-V814, Battery pack NP-22, NP-4000, DC pack DCP-80, Car battery cord DCC-16AE, External microphone ECM-Z200, ECM-K120, External microphone shoe SAD-100, Cable VMC-600M/601M (2 phono to 2 phono), VMC-262M (2 phono to 6-pin), VMC-2104M (4 phono to 21-pin)

Design and specifications are subject to change without notice.

Your dealer may not handle some of the above listed optional accessories. Please ask the dealer for detailed information about the optional accessories available in your country.

Note

This appliance conforms with EEC Directives 76/889 and 82/499 regarding interference suppression.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

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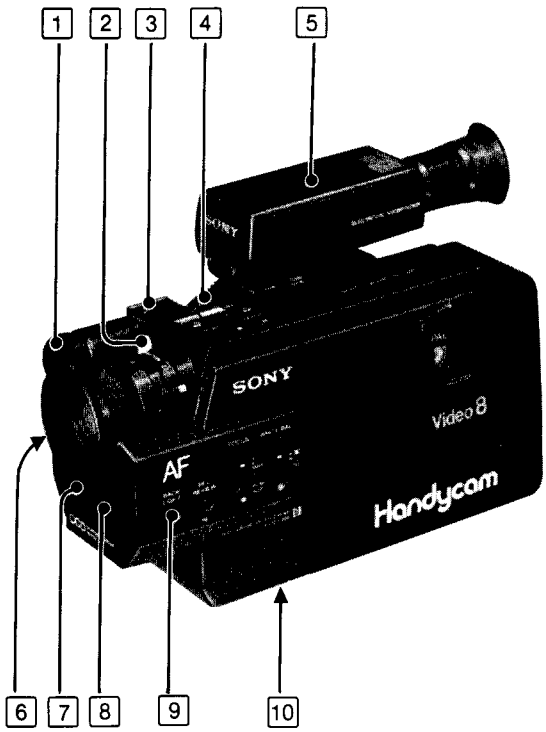
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SECTION 1
GENERAL

1-1. LOCATION AND FUNCTION OF PARTS AND CONTROLS

A-1



For details on the use of each control, refer to the pages indicated in the brackets.

A-1

1 **Built-in microphone**

2 **White balance sensor**
This is the sensor for auto white balance adjustment.

3 **Accessory shoe**
Attach an optional external microphone or video light here.

4 **POWER switch**
CAMERA: For camera recording
PLAYER: For playing back or editing tapes
OFF: Power off

5 **Viewfinder***
The picture being recorded or played back can be monitored in monochrome here. Also, data such as caution indicators and function mode are displayed on the viewfinder screen.

On the bottom
☼ : **Brightness control screw**
⊗ : **Focus control screw**
Normally, there is no need to adjust these screws. Adjust only when the picture is not displayed clearly.

6 **Battery compartment**

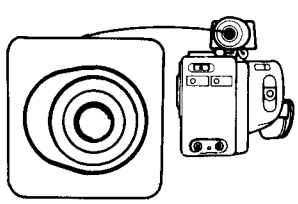
7 **Infrared beam detector**
The infrared beam reflected from the object to be shot is received here during auto focusing.

8 **Infrared beam emitter**
Transmits an infrared beam toward the object to be shot during auto focusing. Do not look into it for a long time when recording with auto focusing.

9 **BACK LIGHT button [18]**

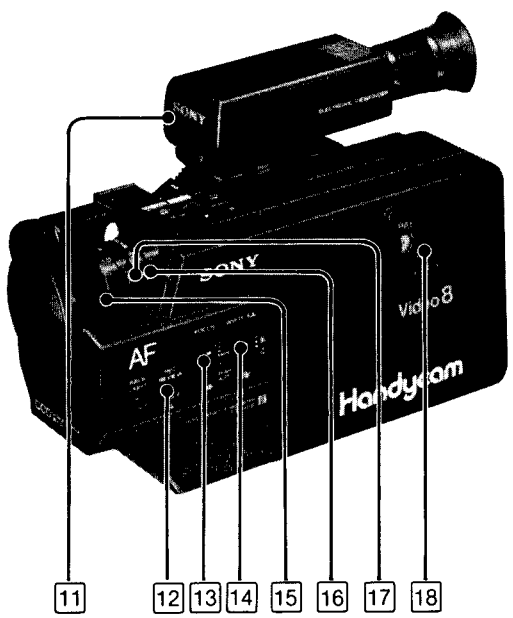
10 **Tripod receptacle**
Attach an optional tripod.

A-2

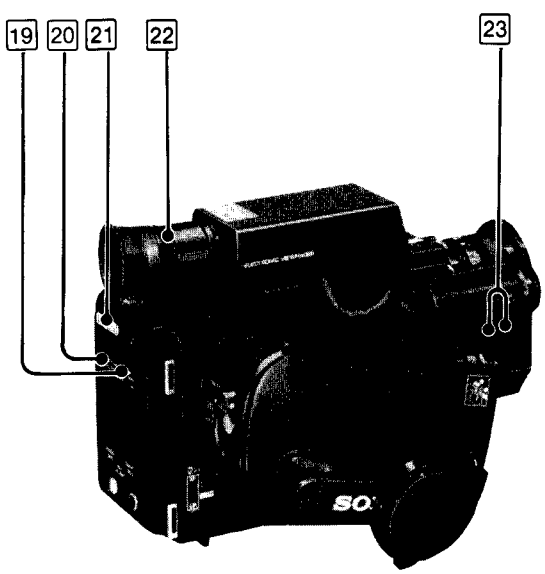


* The eyecup is attached for the right eye. For the left eye, detach the rubber eyecup and attach it as illustrated. A-2

A-3



A-4



A-3

11 **Camera recording/battery lamp**
Lights during camera recording. It blinks when the battery is exhausted.

12 **REC REVIEW (recording review) button [12]**

13 **FOCUS switch**
Normally set to AUTO for auto focusing. To focus manually, set to MAN (manual). To activate the auto focusing function briefly when the switch is set to MAN, hold down the PUSH AUTO button.

14 **WHITE BAL (white balance) switch**
Normally set to AUTO for auto white balance adjustment.
Set it to ☀ (outdoors), or 💡 (indoors) for manual adjustment.

15 **Focus ring [15]**

16 **Macro set button [19]**

17 **Zoom lever [19]**

18 **Cassette holder**

A-4

19 **DEW lamp [25]**
Lights up when moisture has condensed inside the unit.

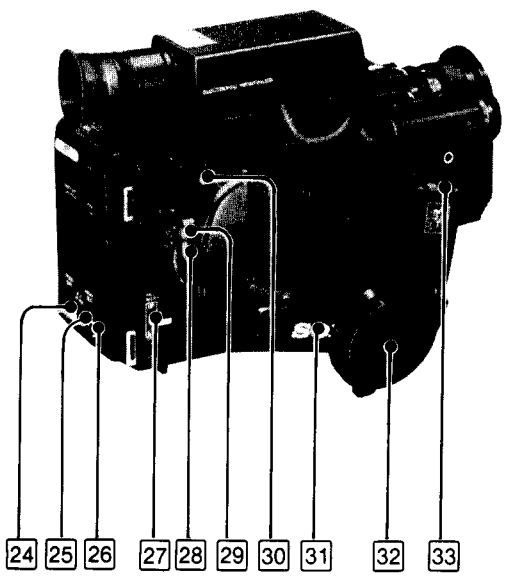
20 **BATTERY/CAUTION lamp**
Blinks when the battery is exhausted, and lights up when the unit cannot record normally.

21 **Cassette eject button [10]**

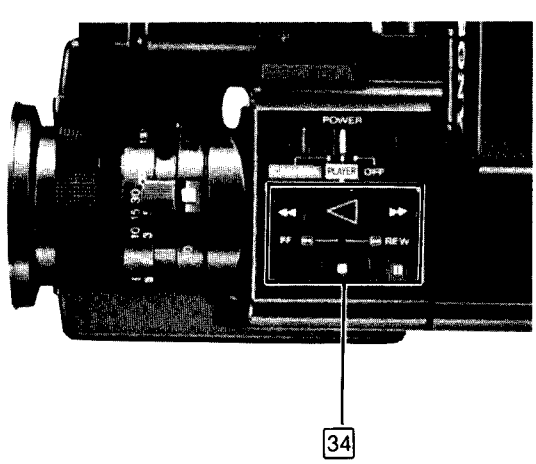
22 **Viewfinder lens adjustment ring**

23 **MIC (external microphone) jack and DC OUT (DC output) jack**

A-5



A-6



A-5

24 VIDEO OUT (video output) jack

25 RFU DC OUT (RFU adaptor DC output) jack

26 AUDIO OUT (audio output) jack

27 REC MODE (recording mode)/EDIT switch

Switch it depending on the operating mode.

Mode	Recording	Playback	Editing
Setting	SP / LP	EDIT	EDIT
Function	REC MODE switch	EDIT switch	

28 START/STOP button

Press to start and stop camera recording.

29 STANDBY switch

Slide up to set the unit to recording pause mode.

30 GRIP RELEASE switch [9]

31 Grip strap

Adjust it so that your fingertips can easily manipulate the START/STOP button.

32 Lens cap

Attach here during recording.

33 BATT EJECT (battery eject) switch

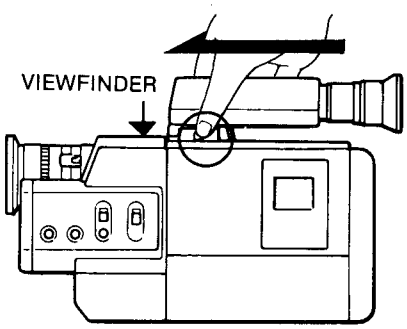
A-6

34 Tape transport buttons [23]

- ◀ (playback)
- ◀◀ FF (fast forward)
- ▶▶ REW (rewind)
- ■ (stop)
- ❚❚ (pause)

1-2. HOW TO ATTACH THE VIEWFINDER

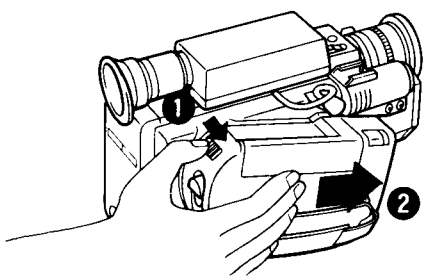
B



1 Slide the viewfinder onto the viewfinder shoe, while pressing the lock/release button on the side of the viewfinder.
2 Slide the viewfinder all the way forward and release the lock/release button.
3 Move the viewfinder back and forth until it locks.
It can be locked in 3 positions. Select the most comfortable position.
4 Plug the connecting cord into the VIEWFINDER jack.

1-3. HOW TO DETACH THE GRIP

C-1



To reduce the recorder's bulk, for example when packing it in a briefcase, you can detach the grip as well as the viewfinder.

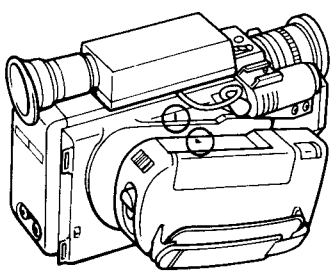
C-1

Slide the grip off while sliding the GRIP RELEASE switch on it.

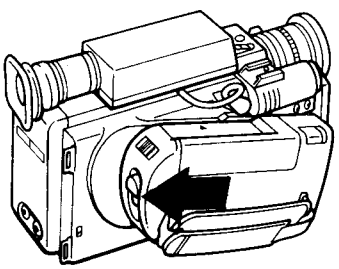
To attach the grip C-2
1 Align the marks.
2 Pull the grip until it locks.

C-2

1



2



1-4. POWER SOURCES

SELECTION OF POWER SOURCES

Operate the unit on one of the following power sources.

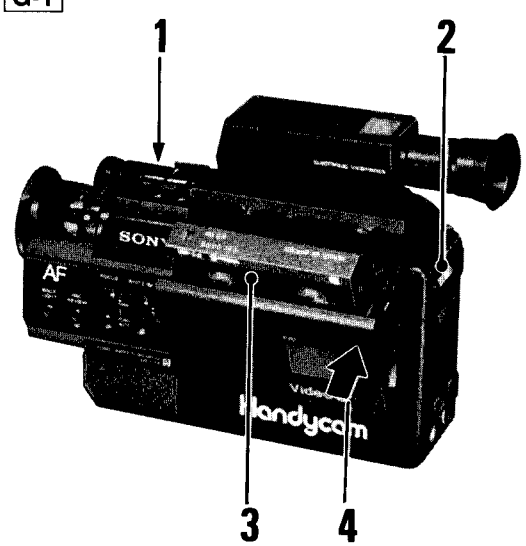
Place	Power source	Accessory to be used
Outdoors	Battery pack	**Battery pack NP-22** (supplied) (page 8)
		Battery pack NP-4000 and DC pack DCP-80 (optional)
Indoors	House current	**AC pack ACP-88** (supplied)
In cars	12 V or 24 V car battery	**DC pack DCP-80 and car battery cord DCC-16AE** (optional)

Note on power source

Do not disconnect the power source or remove the battery pack during recording or playback, because it may damage the inserted cassette tape. If disconnected accidentally, supply the power again immediately.

1-5. CASSETTE CARE

G-1



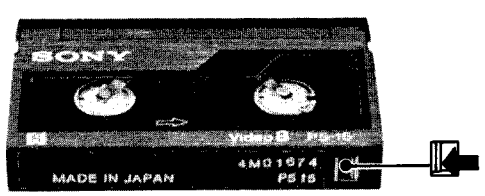
CASSETTE INSERTION G-1

1 Insert a power source.
2 Press and slide the cassette eject button.
The cassette holder will open.
3 Insert a cassette with the window facing outside.
4 Close the cassette holder.

CASSETTE EJECTION

1 Make sure that a power source is inserted.
2 Press and slide the cassette eject button.
3 Take out the cassette and close the cassette holder.

G-2



TO PREVENT ACCIDENTAL ERASURE G-2

Slide out the tab on the cassette so that it covers the opening. (A red mark will appear.)

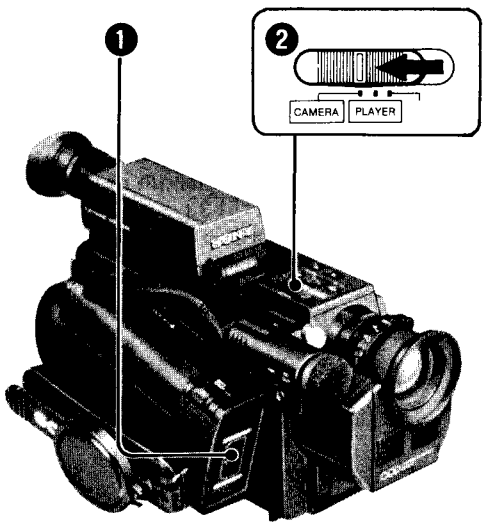
To re-record on the cassette, slide the tab in to uncover the opening.

Notes

- Don't press the upper lid of the cassette compartment forcibly when it is moving.
- Never insert anything in the small holes on the rear of the cassette. These holes are used to sense the kind of tape, thickness of tape, or if the tab is out or in, etc.
- To record from the beginning of the tape, run the video camera recorder for about 15 seconds at the beginning of a cassette before recording. It will avoid missing the starting point during playback on a video cassette recorder.

1-6. PREPARATION FOR CAMERA RECORDING

H-1



[1] Insert a power source, and set the POWER switch to CAMERA. H-1

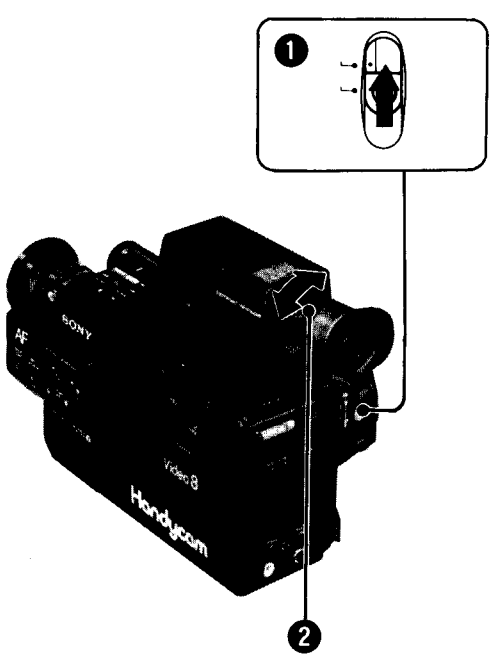
[2] Adjust the position of the viewfinder lens. H-2

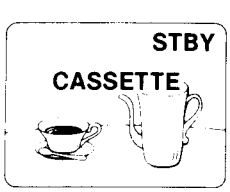
The position of the viewfinder lens for optimum vision varies depending on the person.

1 Slide the STANDBY switch up.
2 Turn the viewfinder lens adjustment ring so that the indicators displayed on the viewfinder screen come into sharp focus.

Adjustment of the position of the viewfinder lens is necessary only for your initial use, or for use after someone else.

H-2



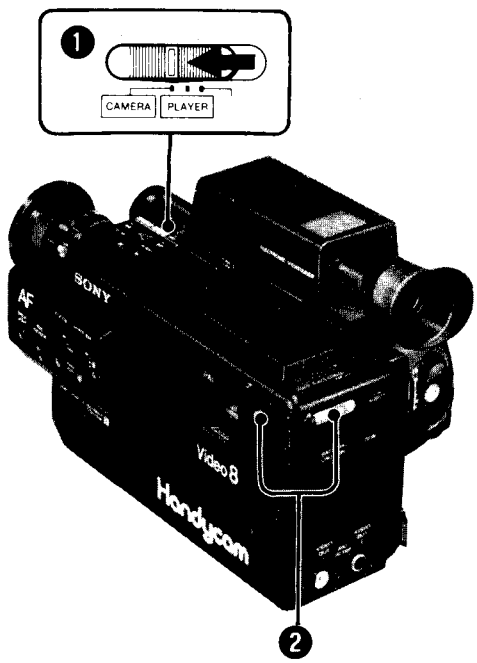


1-7. EASY CAMERA RECORDING WITH AUTOMATIC ADJUSTMENT

I-1



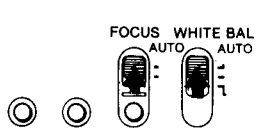
I-2

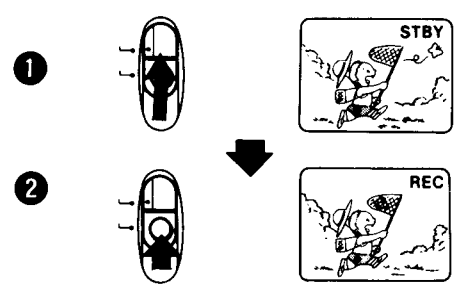


I-3



I-4





I-6



HOW TO RECORD

Hold the camera recorder as in the illustration. I-1

[1] Set the POWER switch to CAMERA, and insert a cassette. I-2

[2] Set the REC MODE switch to LP or SP, according to the length of the programme to be recorded. I-3

The recording time of a cassette in the LP mode is twice as long as that in the SP mode.

[3] Set the following switches to the standard position for automatic adjustment. I-4

- FOCUS switch → AUTO. (auto focusing)
- WHITE BAL switch → AUTO. (linear auto white balance adjustment).

[4] Start recording. I-5

1 Slide the STANDBY switch up.
The unit will enter the recording pause mode.

2 Press the START/STOP button.
Recording will start.

To stop recording, press the START/STOP button again.
The unit will enter the recording pause mode.

After using, slide the STANDBY switch down and set the POWER switch to OFF.

When shooting from a low angle I-6
Raise the viewfinder.

To check the last portion of the previous recording
Press the REC REVIEW button.
The last few seconds of the recorded portion are rewound and then the recorded picture is monitored on the viewfinder screen. The unit then enters the recording pause mode.

Check on the viewfinder screen
STBY: Displayed during recording pause mode.
REC: Displayed during recording.

Note
If you leave the unit in the recording pause mode for 7 minutes or more, the unit will be automatically turned off. To resume recording, slide the STANDBY switch down once and slide it up again.

Notes on automatic adjustment:

- During recording, do not cover the white balance sensor and the infrared beam emitter or the detector.
- During recording with auto focusing, do not turn or stop the focus ring forcibly.
- Keep the lens, the white balance sensor and the infrared beam detector clean.

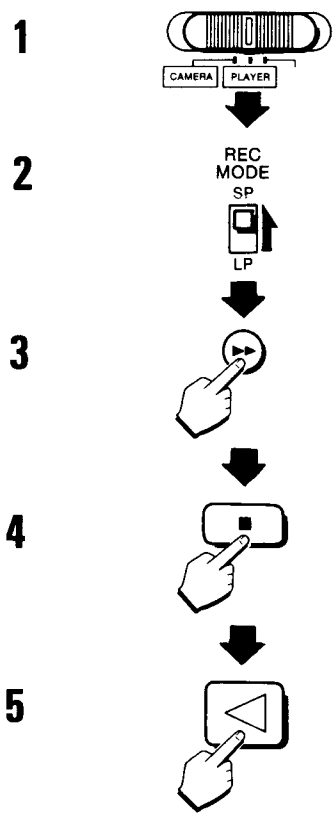
In the following cases, auto focusing and linear auto white balance adjustment will not operate properly:

- When the LOW LIGHT indicator is displayed on the viewfinder screen.
- Under certain conditions.

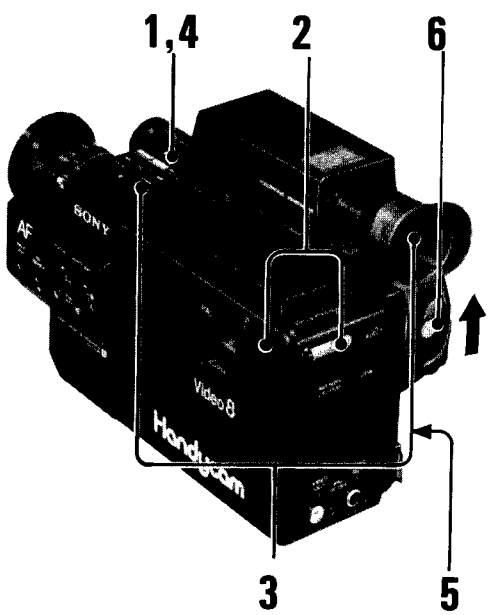
Indicators inside the viewfinder

Position	Indicator	Meaning
	BATTERY	Weak battery.
	CAUTION	The unit cannot record normally.
⊠	DEW	Moisture condensation inside the unit. (page 25)
	CASSETTE	No cassette inserted. The safety tab is slid out. (page 10)
	TAPE END	The tape is at its end.
	OUTDOOR	The WHITE BAL switch is set to ☀.
⊠	INDOOR	The WHITE BAL switch is set to 💡.
	LOW LIGHT	Insufficient light.
	BACK LIGHT	The BACK LIGHT button has been pressed. (page 18)

J



K



INSTANT PLAYBACK ON THE SPOT J

1 **Set the POWER switch to PLAYER.**
2 **Set the REC MODE/EDIT switch in the upper position.**
3 **Rewind the tape with the ▶▶ button.**
4 **Stop the tape with the ■ button.**
5 **Start playback with the ◀ button.**
The playback picture will appear on the viewfinder screen.

To resume recording in the LP mode, slide the REC MODE/EDIT switch down.

SMOOTH RECORDING K

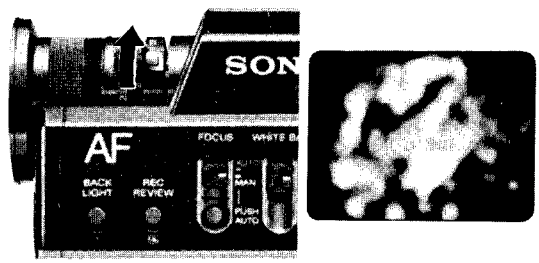
A smooth transition between scenes can be made after the recording is stopped or the unit is turned off, provided that the cassette isn't removed.

To record smoothly after having removed the cassette, proceed as follows.
1 **Set the POWER switch to PLAYER.**
2 **Insert the cassette.**
3 **Looking at the playback picture on the viewfinder screen, press the II button where you want to restart recording.**
4 **Set the POWER switch to CAMERA.**
5 **Select the same recording mode with the REC MODE/EDIT switch as was used for the already recorded portion.**
6 **Slide the STANDBY switch up, and press the START/STOP button.**
Recording will start.

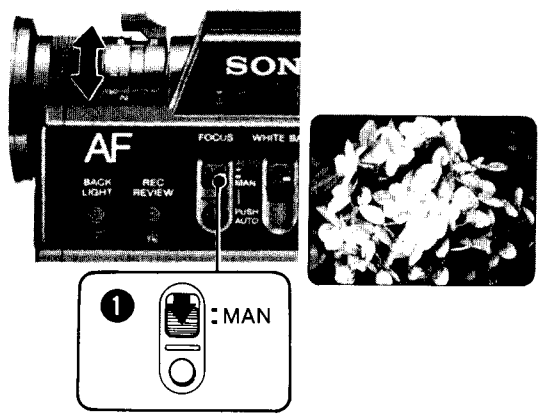
It is helpful to note on the cassette the mode, SP or LP, in which it was recorded.

1-8. MANUAL FOCUSING

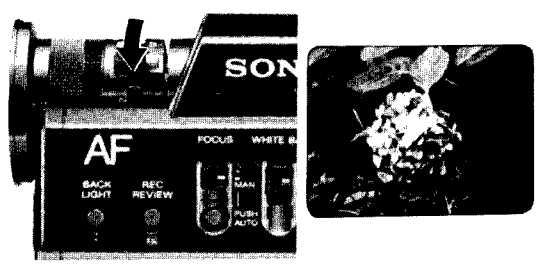
L-1



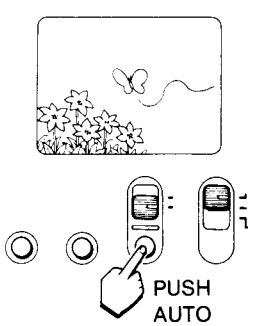
L-2



L-3



L-4



Use manual focusing when shooting subjects difficult to focus automatically (listed on page 16).

[1] Make the subject as large as possible in the viewfinder. L-1
Turn the zoom lever to the telephoto position (30).

[2] Focus. L-2
1 Set the FOCUS switch to MAN.
2 Turn the focus ring to bring the object into focus.

[3] Set the desired shot length by turning the zoom lever. L-3

To activate auto focusing quickly from the manual focusing mode L-4
Press the PUSH AUTO button. Auto focusing will function as long as it is kept pressed.

Auto focusing system of this camera recorder
This recorder adjusts focus automatically by emitting an infrared beam at the objects to be shot and then detecting the reflected beam.
When the subject is approximately 3 meters away from the camera recorder, the focus is sharpest in the center of the screen. The camera recorder has the tendency, however, to focus a bit lower to the left when the subject is within 3 meters, and a bit higher to the right when the subject is more than 3 meters away.

Note
As the auto focusing of this camera recorder utilizes an infrared beam, it might malfunction when you use the camera recorder near another equipment that also emits an infrared beam such as a TV or VTR remote commander, or another camera recorder that uses an infrared beam for auto focusing.
It might also cause malfunctioning of such equipment.

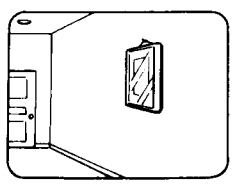
Some helpful hints
- When shooting a scene with lots of movement in bright light, the subject can be kept in good focus by setting the zoom lever to 12 and the focus ring to 2m, regardless of the distance between the subject and the recorder.
- When shooting in low light situations such as indoors, the depth of field in proper focus is very shallow. For best results, shoot at wide angles, after focusing in telephoto.
- The figures on the focus ring indicate the distance between the subject and the ϕ mark on the side of the recorder body.

M

[a]



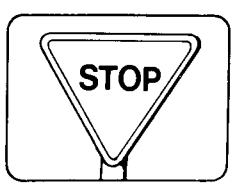
[b]



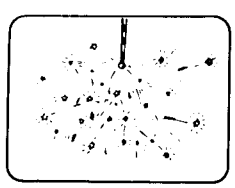
[c]



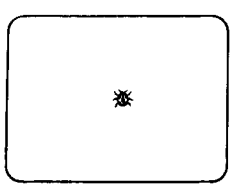
[d]



[e]



[f]



POOR CONDITIONS FOR AUTO FOCUSING M

Auto fucusing functions when shooting almost any subject centered in the viewfinder. However, it does not work for some subjects, particularly those listed below. To shoot such subjects you must use manual focusing.

[a] Black objects which absorb the infrared beam
Ex. dark curtains or shade

[b] Objects in which the infrared reflection disperses
Ex. a smooth slanting surface (Auto focusing functions when the camera is aimed squarely at the subject.)

[c] Objects in which the infrared reflection is not sufficient
Ex. bushes, grass or plants in the telephoto position

[d] Objects in which the infrared beam is reflected too much
Ex. traffic signs, a white wall, a mirror, or a subject through plate glass

[e] Objects not solid
Ex. fireworks, candle flame or smoke

[f] Exteremely small objects which do not cover more than 1/10 of the viewfinder's area
Ex. insects

- **Objects which emit infrared beams themselves,**
  such as automatic doors or fluorescent lights.
- **Objects more than 13 meters (43 feet) away from the recorder**

Auto focusing also does not function in these cases:
When simultaneously using several camera recorders which have an infrared beam auto focus system.

When using a conversion lens or special effect filters

OTHER USES OF MANUAL FOCUSING

When shooting still objects

To avoid battery wear
When the FOCUS switch is set to AUTO, auto focusing operates even in the recording pause mode so the focus ring moves automatically. This causes continuous battery wear.

When shooting in macro
(See page 19.)

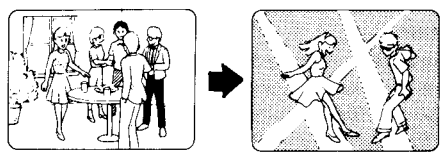
1-9. WHITE BALANCE ADJUSTMENT

N

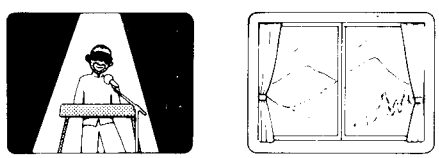
[a]



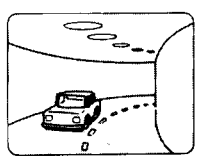
[b]



[c]



[d]



Adjustment of white balance is for recording the picture with natural color tone without reference to the condition of the light source.

Set the position of the WHITE BAL switch manually when shooting under certain conditions (listed below).

HOW TO SET THE WHITE BAL SELECTOR

Recording outdoors—Set to ☀ (5800K).
(OUTDOOR indicator appears on the viewfinder screen.)
Recording indoors—Set to ☆ (3200K)
(INDOOR indicator appears on the viewfinder screen.)

Recommended settings for various subjects
☀: sunset, fireworks, subjects beside a sunny window, etc.
☆: candle flames in darkness, subjects in the spotlight, scenes before sunrise, subjects in a tunnel (illuminated by natruim lamps), neonlights, etc.

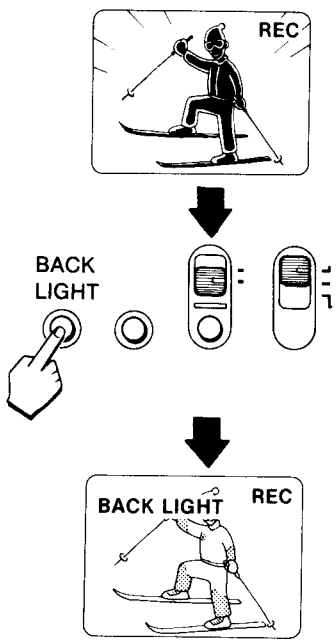
POOR CONDITIONS FOR LINEAR AUTO WHITE BALANCE ADJUSTMENT N

[a] Insufficient light
[b] When lighting conditions change quickly
[c] When the light condition for the subject is different from that for the unit
ex. when the subject is in a spotlight when the subject is outdoors but the camera is indoors
[d] Special light sources such as natrium lamp, etc.

Linear auto white balance system of this camera recorder:
Utilizes a white balance sensor to determine the color temperature of the ambient light and adjust the white balance accordingly (See page 39). As the sensor is built in the unit, however, optimum white balance adjustment cannot be obtained if the subject and this unit are under different lighting conditions.

1-10. BACK LIGHT ADJUSTMENT

O



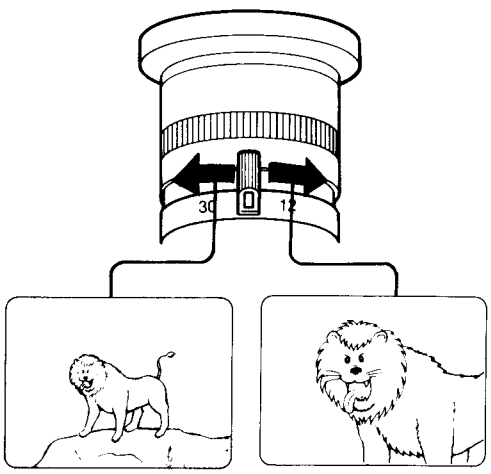
This unit adjusts the iris automatically. However, when shooting a subject that is backlit, press the BACK LIGHT button.
(The BACK LIGHT Indicator appears when the BACK LIGHT button has been pressed.)

After shooting that particular scene, press the BACK LIGHT button again to release it.
(The BACK LIGHT indicator goes out.)

Note
Be sure to release the back light adjustment function when it becomes unnecessary. Otherwise the recorded picture will be too bright.
(The function will be released once the POWER switch is set to OFF.)

1-11. ZOOMING

P



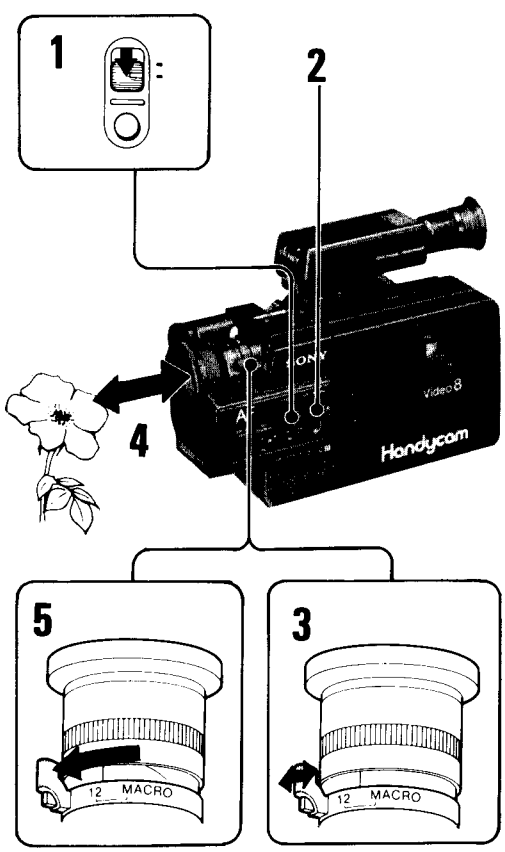
The size of the subject in the scene can be changed.

Turn the zoom lever to the right for telephoto, and turn it to the left for wide-angle.

You can obtain more zooming efects by using an optional conversion lens (VCL-1546 or VCL-0746). Auto focusing, however, will not function in that case.

1-12. CLOSE-UPS(MACRO)

Q



Even tiny objects can literally fill the screen for dramatic close-up effects.

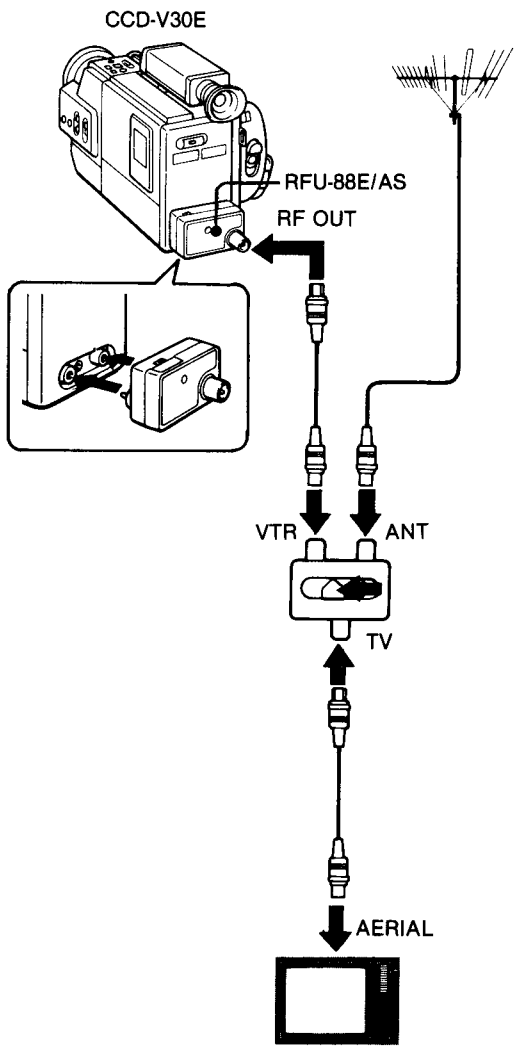
1 Set the FOCUS switch to MAN.
2 Set the WHITE BAL switch to ☀ or ☁ .
3 Turn the zoom lever to the left for MACRO position, holding down the green macro set button.
4 Bring the recorder as close as necessary to obtain the desired subject size.
The subject can be as close as approximately 90 mm (3⅝ in.) from the lens surface.
5 Turn the zoom lever within the MACRO range to focus sharply.

Notes

- Auto focusing or linear auto white balance adjustment does not function properly in macro shooting.
- If the subject is closer than 90 mm, it cannot be brought into focus.
- When shooting in macro, the depth of field is very shallow, so pay attention to focus. To keep the subject in focus, use a tripod or monopod.
- Zooming is not possible during macro recording. To change the size of the subject, move the camera recorder closer or further away.

1-13. PREPARATION FOR PLAYBACK-CONNECTING A TV SET

S-1

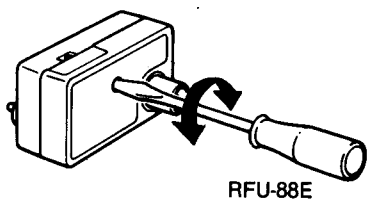


[1] Connecting a TV without audio/video input jacks S-1

Connect the supplied RFU adaptor RFU-88E/AS to the CCD-V30E.

1 Connect the aerial, RFU-88E/AS, and TV to the aerial selector (supplied with the RFU-88E/AS) using the supplied 75-ohm coaxial cables.
2 For the RFU-88E only:
Set the I/G selector according to the TV system of your country.
3 Adjust one of the TV programme position to receive the signal from the video camera recorder. See "Adjusting the TV" on page 21.
4 Set the selector switch on the aerial selector to VTR for viewing a playback picture.
5 Select the same channel on the TV as that selected in adjusting the TV.

S-2



RFU-88E

Adjusting the TV with the RFU-88E/UK

1 Turn on the TV and select a programme position which is not being used to recieve a TV station.
2 Set the POWER switch of the CCD-V30E to CAMERA and slide the STANDBY switch up.
3 Set the selector switch of the aerial selector to VTR.
4 Tune the TV until you see the picture and hear the sound from the CCD-V30E.

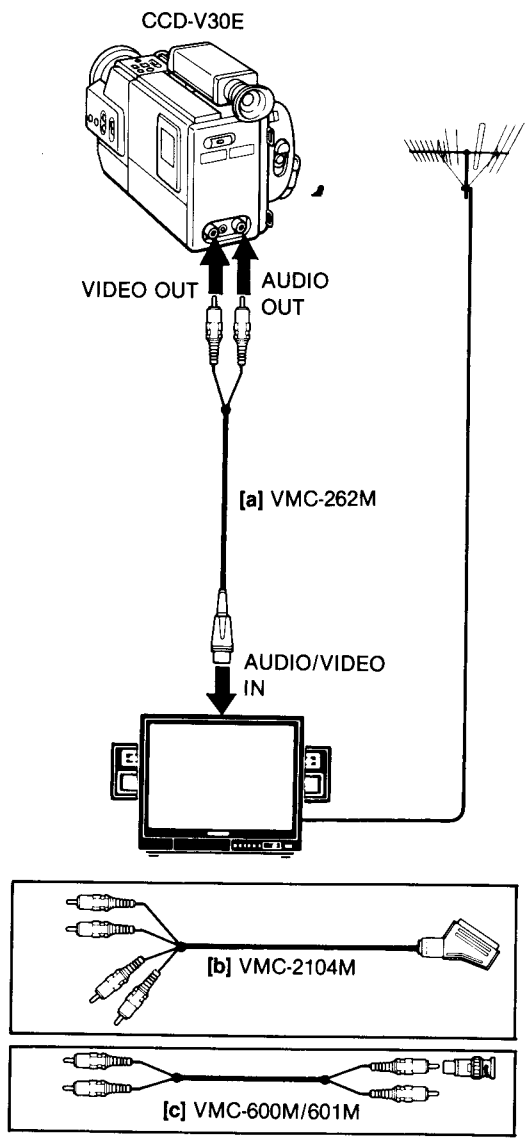
If the playback picture is not free of disturbance

1 Set the selector switch of the aerial selector to ANT.
2 Adjust the programme position of the TV to a channel between UHF channels 30 and 39 with the tuning control or the fine tuning control on the TV, so that the TV screen shows no picture and so that a steady rustling sound or no sound is heard.
3 Set the selector switch of the aerial selector to VTR.
4 Slowly turn the RF channel of the RFU-88E with the supplied screwdriver, until the picture from the CCD-V30E becomes clear. S-2
Now the TV adjustment is complete.

Adjusting the TV with the RFU-88AS

Select the CHANNEL selector on the RFU-88AS to 0 CH or 1 CH, whichever is not active in your area, and select the same channel on the TV.

S-3



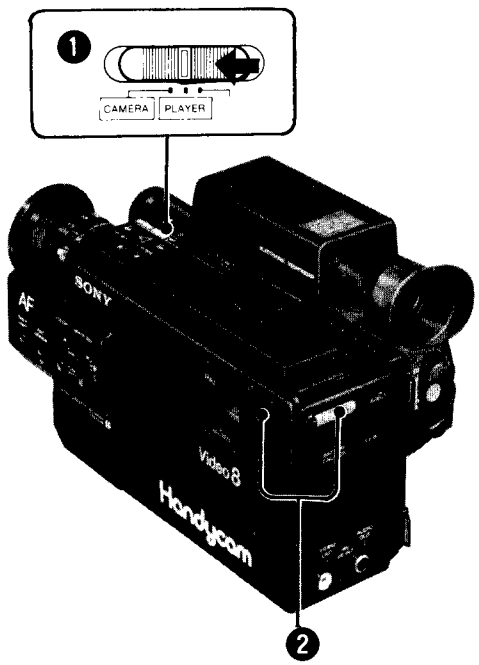
[2] Connecting a TV (or colour monitor) with audio/video input jacks S-3

Leave the TV aerial cable connected to the TV.

1 Connect the CCD-V30E to the TV using an optional connecting cable to match the connectors on the TV.
   [a] VMC-262M: to a 6-pin DIN connector
   [b] VMC-2104M: to a 21-pin connector (EUROCONNECTOR)
   [c] VMC-600M/601M: to phono and BNC-type connectors
2 Set the TV/VIDEO selector on the TV to VIDEO for viewing a playback picture.

1-14. PLAYBACK

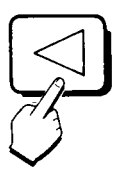
T-1



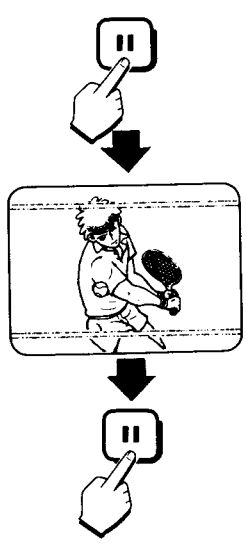
T-2



T-3



T-4



Turn on the TV (or colour monitor), and select the channel for viewing a playback picture (or set the TV/VIDEO selector to VIDEO).

1 Set the POWER switch to PLAYER, and insert a casette. T-1
2 Set the REC MODE/EDIT switch in the upper position. T-2
The unit detects the recorded mode of the tape, and adjust the tape speed automatically.
3 Press the ◀ button. T-3
Playback will start.

To stop the tape, press the ■ button.
After using, be sure to set the POWER switch of the recorder to OFF.

To get a still picture T-4
Press the ❚❚ button during playback. To resume playback, press the ❚❚ button again.

Notes

- If you move the position of the POWER switch during playback, the tape will stop. When you move the POWER switch to CAMERA in the playback pause mode, however, the unit will enter recording pause mode.
- When the pause mode lasts for 7 minutes or more, the unit will automatically enter the stop mode.
- Streaks will appear and the sound will be muted in the still picture and the high-speed picture.
- When a tape is recorded in SP mode, a still picture and high-speed picture may be noisy with many streaks and become black and white. Streaks will be wider than those of an LP-recorded tape.

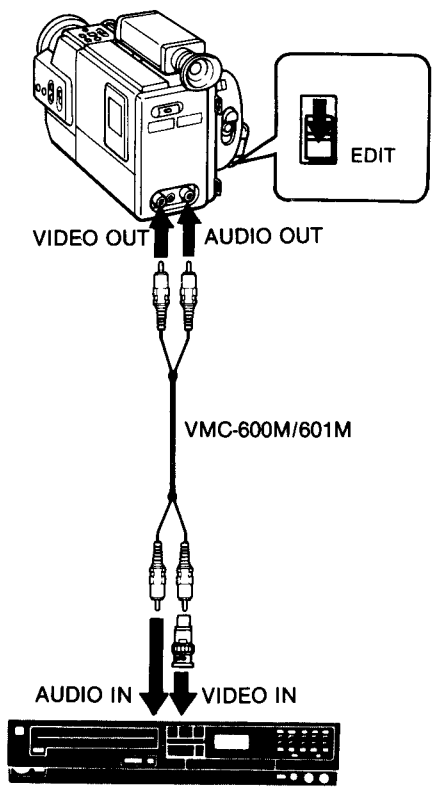
MONITORING A HIGH-SPEED PICTURE

To skip over or repeat a certain portion

1 In the playback mode, press the ◀◀ or ▶▶ button.
The picture will be monitored at high speed as long as it is kept pressed.
2 Release the ◀◀ or ▶▶ button at the desired point.
Normal playback will resume.

1-15. TAPE EDITING

U



CONNECTION WITH ANOTHER VTR U

To edit a home movie tape, another VTR with AUDIO/VIDEO IN jacks is required.

Use the connecting cord VMC-600M/601M for connection. (If the AUDIO IN jack of the other video recorder is stereo, use the VMC-608MS/609MS instead.)

HOW TO EDIT

CAUTION
Television programs, films, video tapes and other materials may be copyrighted. Unauthorized duplication of such material may be contrary to the provisions of the copyright laws.

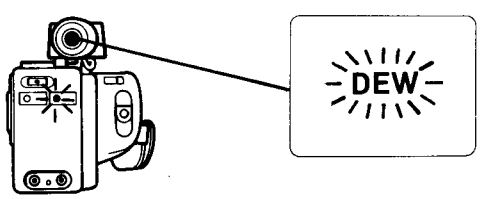
1 Set the POWER switch of the CCD-V30E to PLAYER, and turn on the other VTR.
2 Insert a recorded cassette to the CCD-V30E, and a blank cassette to the other VTR.
Be sure that the blank tape is rewound to the beginning.
3 Slide down the REC MODE/EDIT switch of CCD-V30E.
4 Set the input selector of the VTR to LINE.
5 Press the ❚❚ button of the CCD-V30E during playback at the point where you want to start recording.
6 Press the record button of the other VTR, pressing the ❚❚ button.
7 Release the ❚❚ buttons of both units.
Recording will start.

After editing, turn off both units and be sure to slide the REC MODE/EDIT switch to the upper position.

To cut off an unnecessary portion
Press the ❚❚ button of the other VTR at the beginning of the unnecessary portion.
Release it where you want to resume recording.

Function of the EDIT switch
Slide this switch down whenever you edit tapes. Signal loss that results from tape-to-tape transfer will be reduced, achieving more accurate signal transfer.
When recording in the SP mode or playing back normally, keep this switch in the upper position.

1-16. NOTES ON MOISTURE CONDENSATION



If the unit is brought directly from a cold to a warm location, moisture may condense inside the unit, on the surface or the tape or on the lens. In this condition, the tape may adhere to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the unit is furnished with moisture sensors.

Moisture is present inside the unit when:
- The DEW lamp lights up outside the recorder.
- The DEW indicator blinks inside the viewfinder.

No function except for cassette ejection will work.

↓

Eject the cassette if present, and turn off the unit and leave it with the cassette holder open (at least for one hour).

↓

The unit can be used again if the upper lid of the cassette compartment shuts automatically when you push the PUSH mark on the front lid.

If moisture condensation occurs on the tape surface
There are no caution indicators, but no function except for cassette ejection will work.

↓

Eject the cassette and let it dry thoroughly before resuming use.

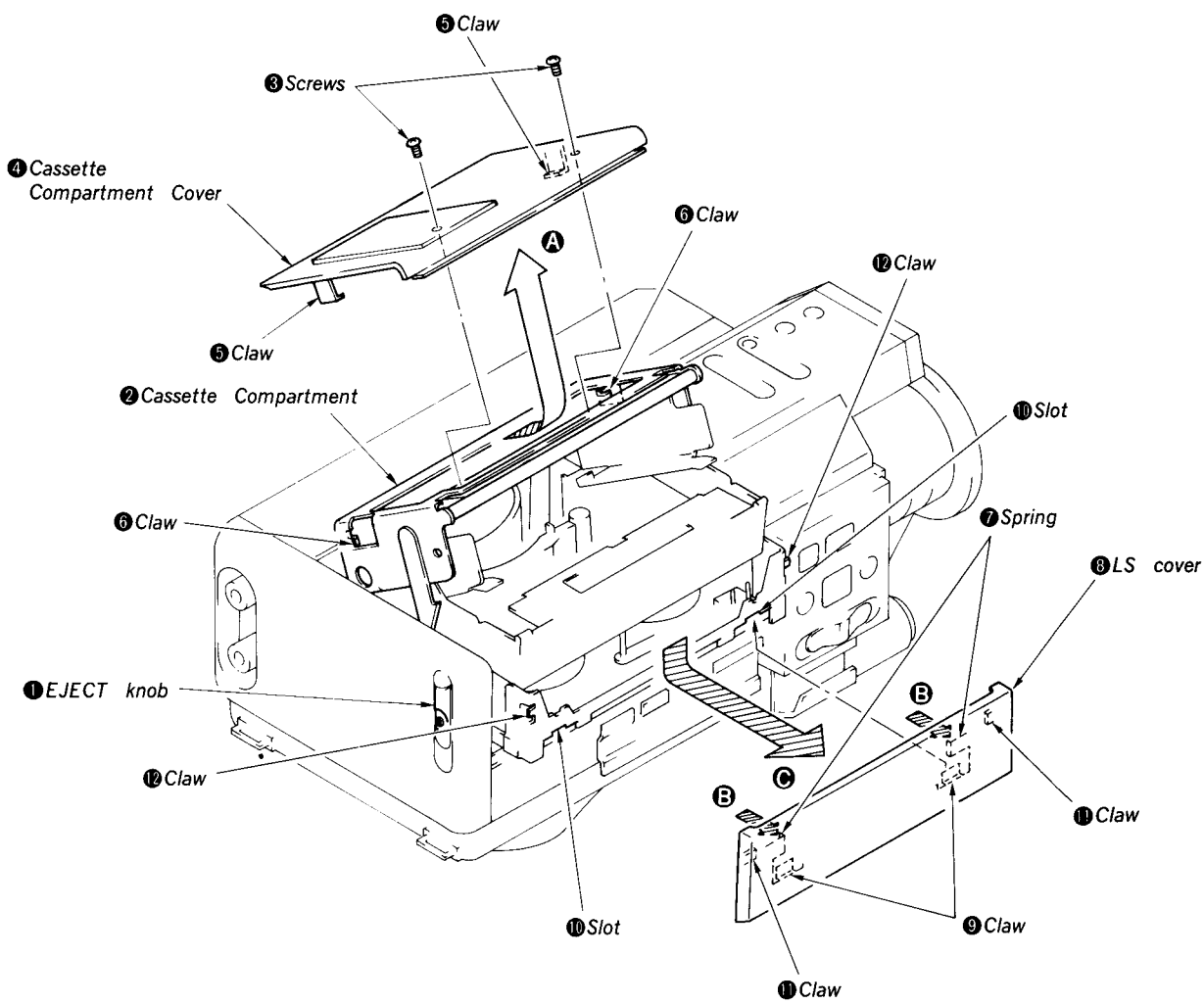
If moisture condensation occurs on the lens there are no caution indicators, but the lens becomes dim. Trun off the power and leave the unit unused at least for one hour.

Note
Do not push the upper lid of the cassette compartment forcibly when it doesn't shut automatically. Let the unit dry out a bit longer.

SECTION 2
DISASSEMBLY

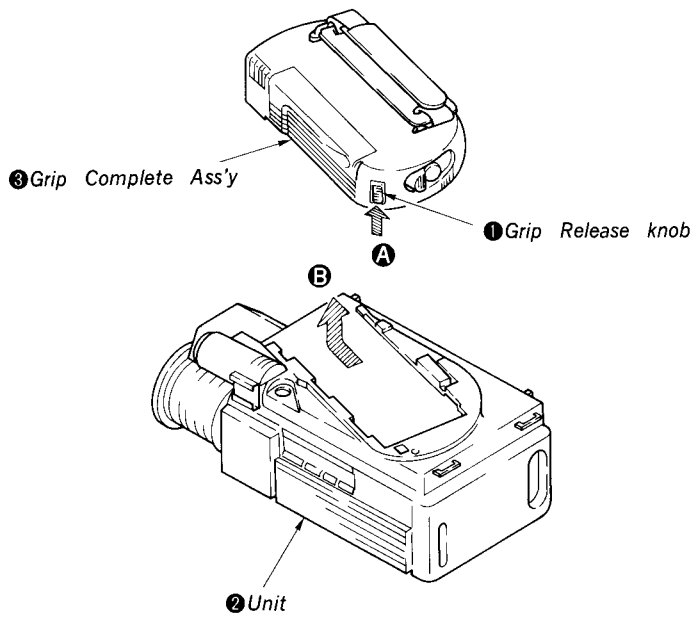
2-1. REMOVAL OF CASSETTE COMPARTMENT COVER AND LS COVER

1) Turn EJECT knob to "ON", and put the casette compartment ❶ in the "UP" state.
2) Remove 2 screws ❸.
3) Remove cassette compartment cover ❹ by sliding in the direction of arrow Ⓐ.
   * When installing, set so the 2 positions of the claws ❺ become fit into the 2 positions below claws ❻.
4) while inserting a thin flat blade screwdriver, etc. and pushing spring ❼ in the direction of arrow Ⓑ, remove LS cover ❽ by sliding it in the direction of arrow Ⓒ.
   * When installing, set so that claw ❾ comes to the slot ❿ and claw ⓫ comes to rear of claw ⓬.



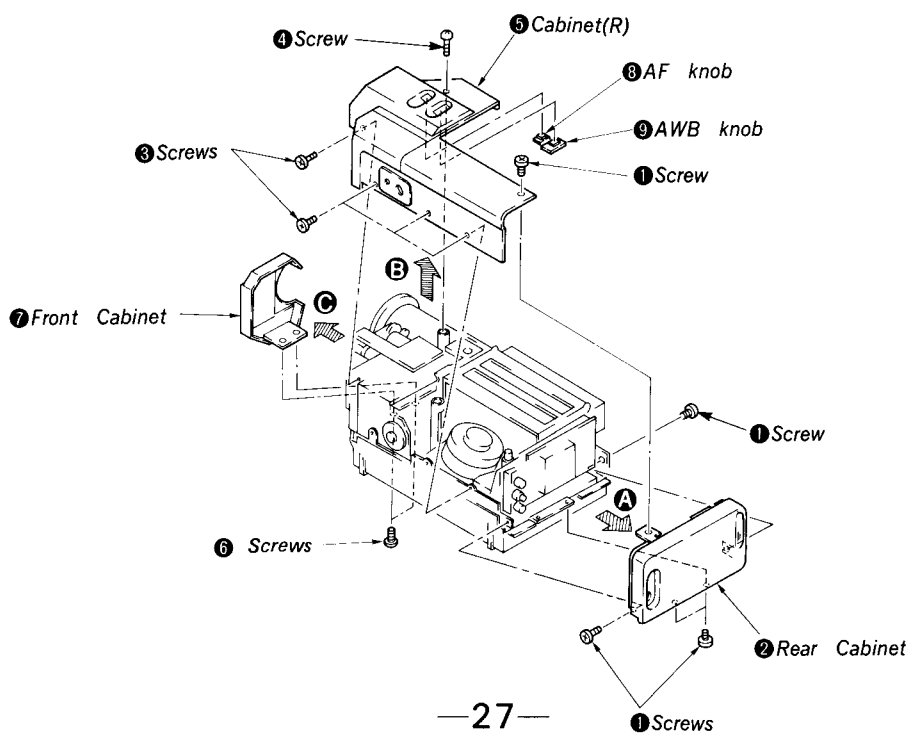
2-2. REMOVAL OF THE GRIP COMPLETE ASSEMBLY

1) Remove the grip complete assembly ❸ from the unit ❷ in the direction of arrow Ⓑ while sliding the grip release knob ❶ in the direction of arrow Ⓐ.



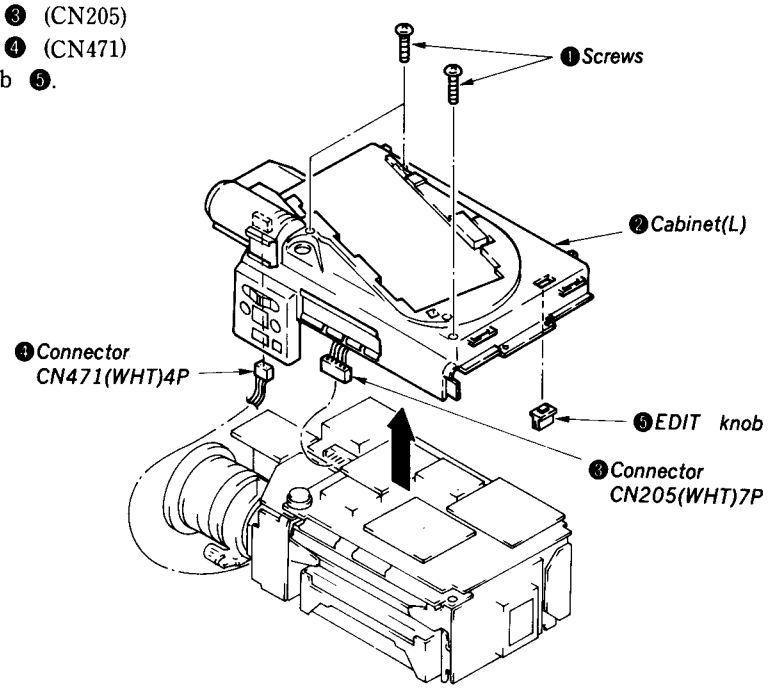
2-3. REMOVAL OF FRONT CABINET, CABINET(R) AND REAR CABINET

1) Remove five screws ❶.
2) Remove rear cabinet ❷ in the direction of arrow Ⓐ.
3) Remove four screws ❸.
4) Remove screw ❹.
5) Remove cabinet(R) ❺ in the direction of arrow Ⓑ.
6) Remove two screws ❻.
7) Remove the front cabinet ❼ in the direction of arrow Ⓒ.
8) Remove the AF knob ❽ and the AWB knob ❾.



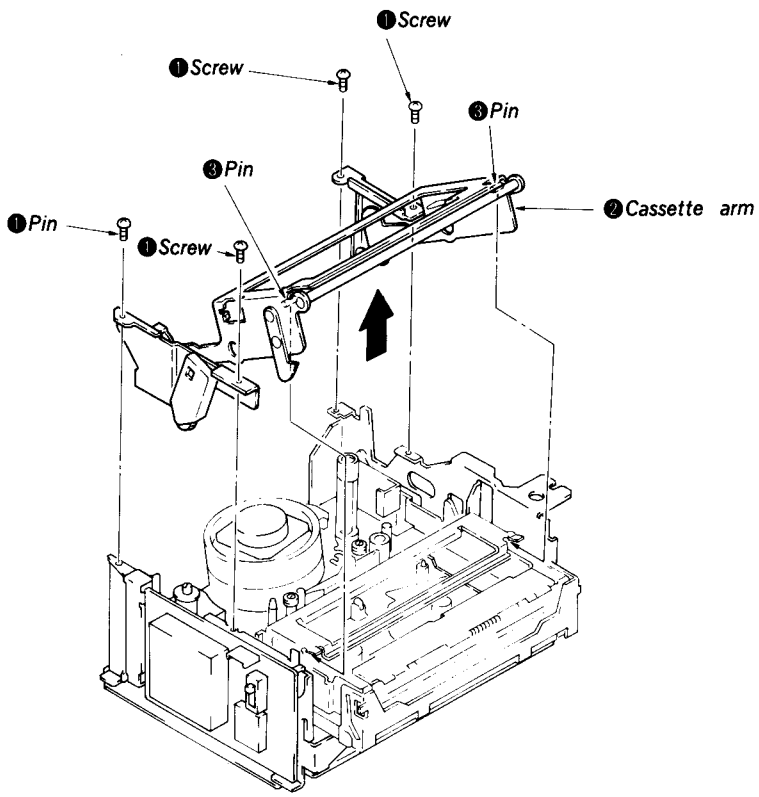
2-4. REMOVAL OF THE CABINET(L) ASSEMBLY

1) Remove three screws ❶.
2) Remove the cabinet(L) assembly ❷ in the direction of arrow.
3) Remove the connector ❸ (CN205)
4) Remove the connector ❹ (CN471)
5) Remove the EDIT knob ❺.



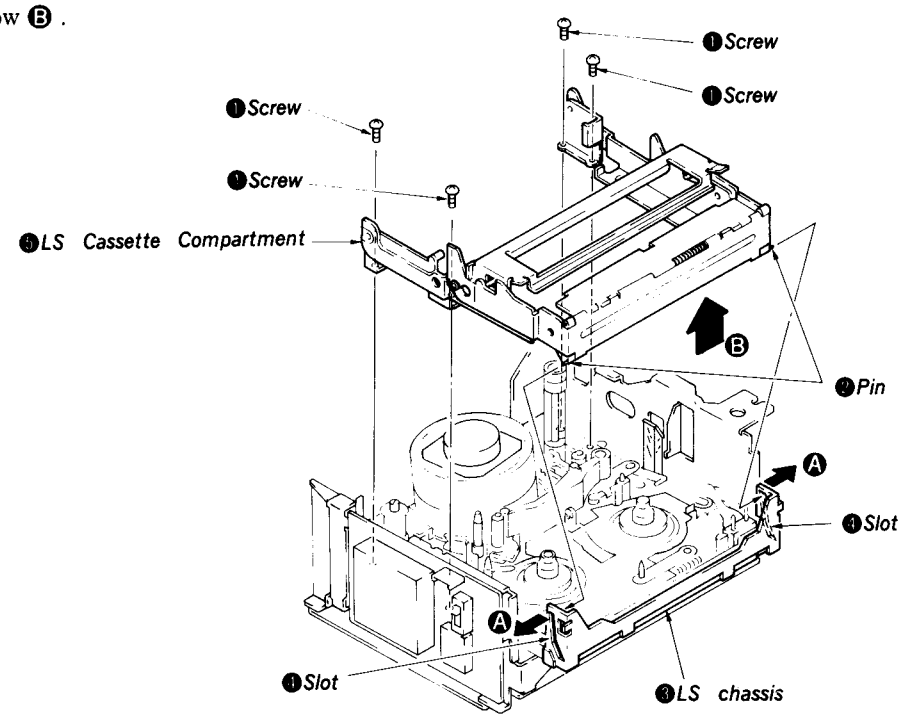
2-5. REMOVAL OF CASSETTE ARM

1) Remove 4 screws ❶.
2) Remove cassette arm ❷ in the upper direction.
   * When installing the cassette arm ❷, be sure that pin ❸ is inserted into the predetermined position.



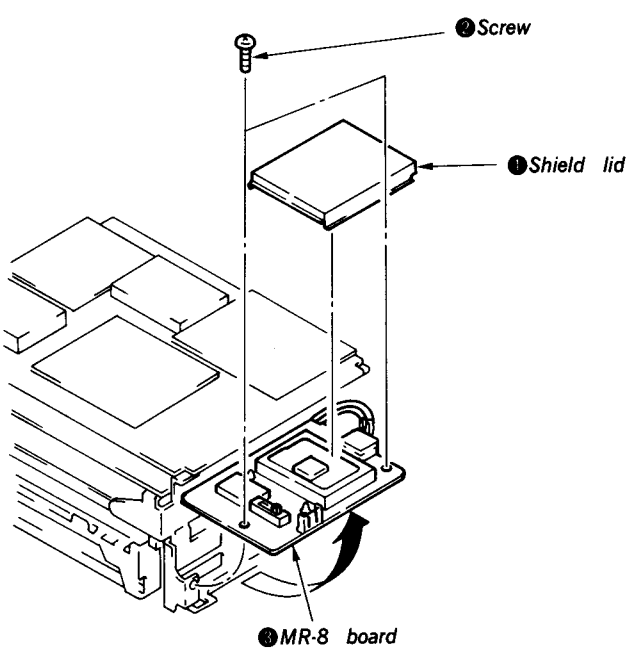
2-6. REMOVAL OF LS CASSETTE COMPARTMENT

1) Remove 4 screws ❶.
2) Bend 2 positions of the slot section ❹ of LS chassis ❸ in the direction of arrow Ⓐ and then remove 2 positions of pin ❷.
3) Remove LS cassette compartment ❺ in the direction of arrow Ⓑ.



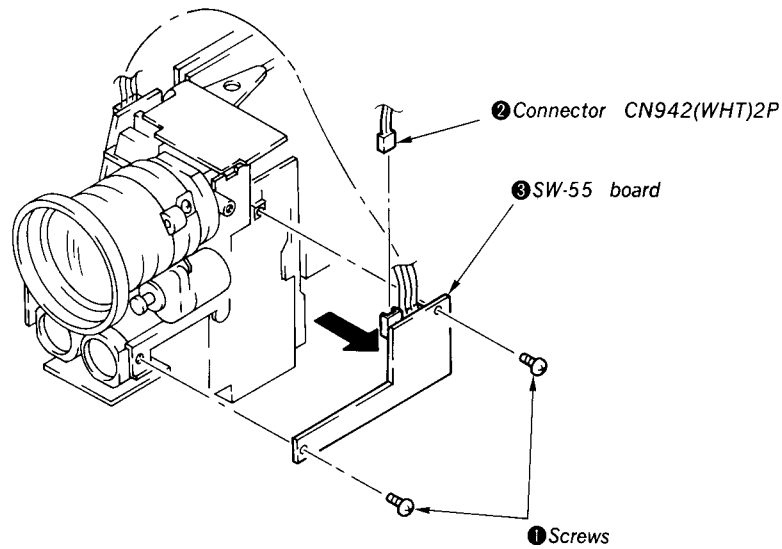
2-7. OPENING OF THE MR-8 BOARD

1) Remove of the Shield lid ❶.
2) Remove 2 screws ❷.
3) Open the MR-8 board ❸ in the direction of arrow.
   * You will hear a tearing sound, but this causes no problem.



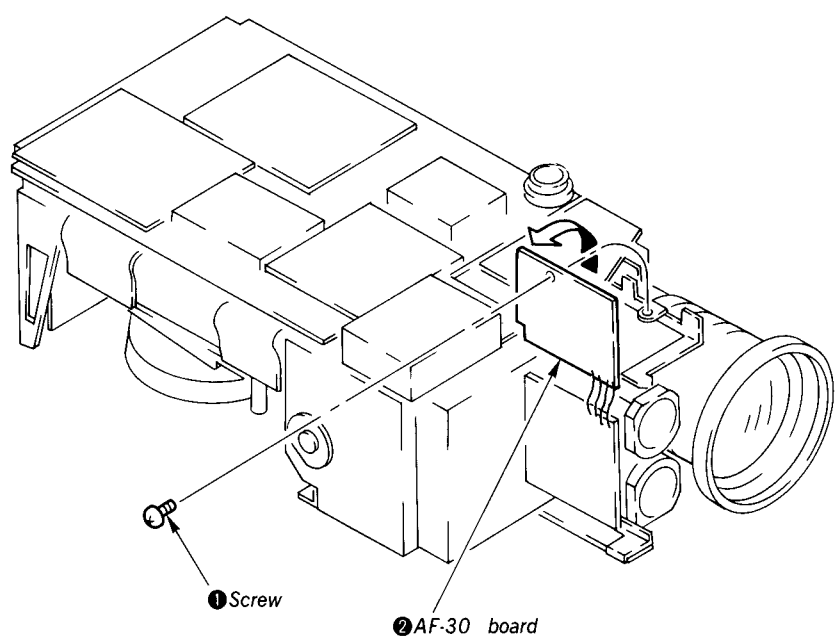
2-8. REMOVAL OF THE SW-55 BOARD

1) Remove two screws ❶.
2) Remove the connector ❷ (CN942).
3) Remove the SW-55 board ❸ in the direction of arrow.



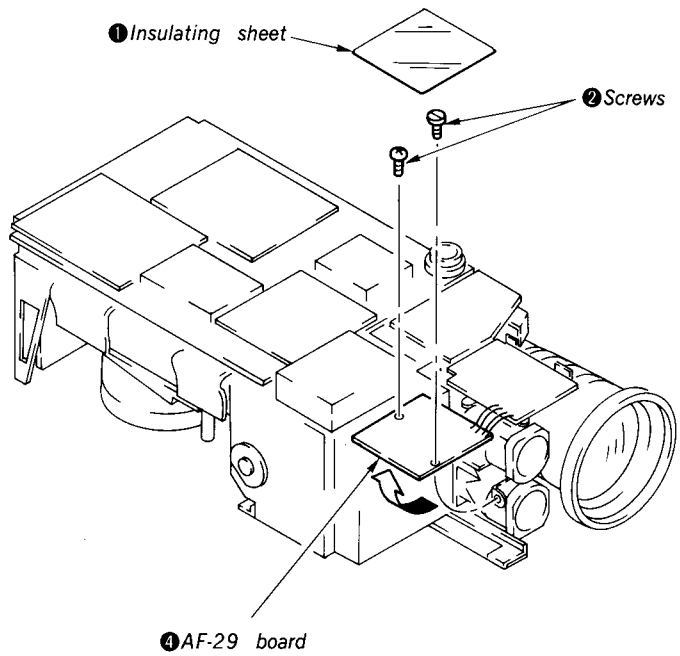
2-9. OPENING OF THE AF-30 BOARD

1) Remove the screw ❶.
2) Opening the AF-30 board ❷ in the direction of arrow.



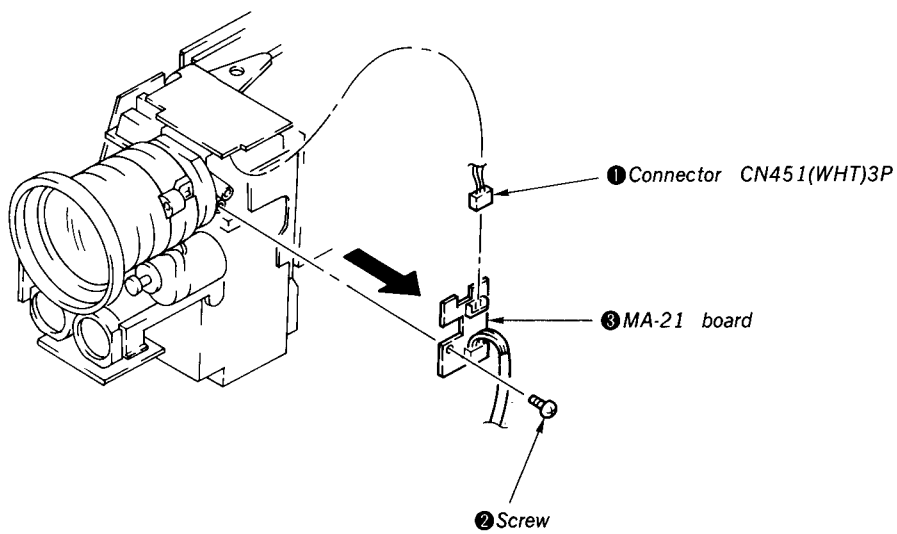
2-10. OPENING OF THE AF-29 BOARD

1) Remove insulating sheet ❶.
2) Remove two screws ❶.
3) Opening the AF-29 board ❷ in the direction of arrow.



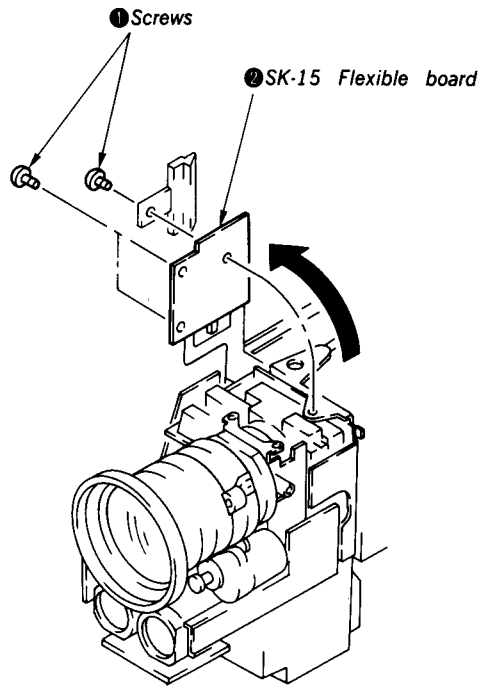
2-11. OPENING OF THE MA-21 BOARD

1) Perform "2-8. OPENING OF THE SW-55 BOARD".
2) Remove the connector ❶(CN451).
3) Remove the screw ❶.
4) Remove the MA-21 board ❸ in the direction of arrow.



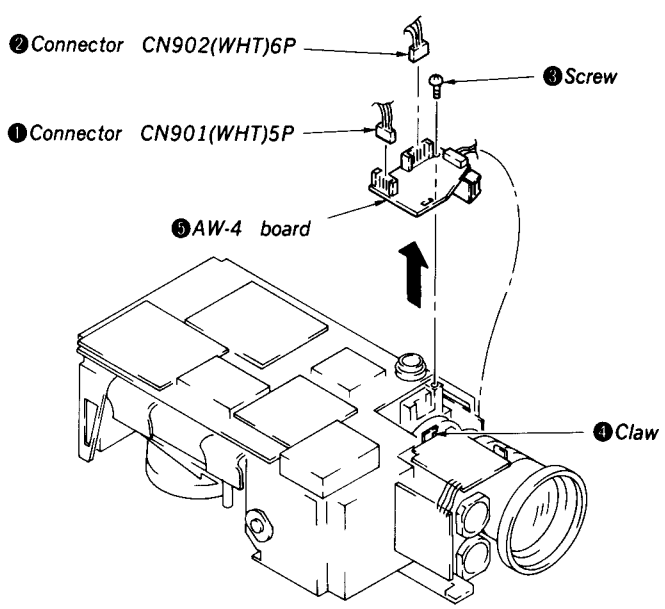
2-12. OPENING OF THE SK-15 FLEXIBLE BOARD

1) Remove three screws ❶.
2) Open the SK-15 board ❷ in the direction of arrow.



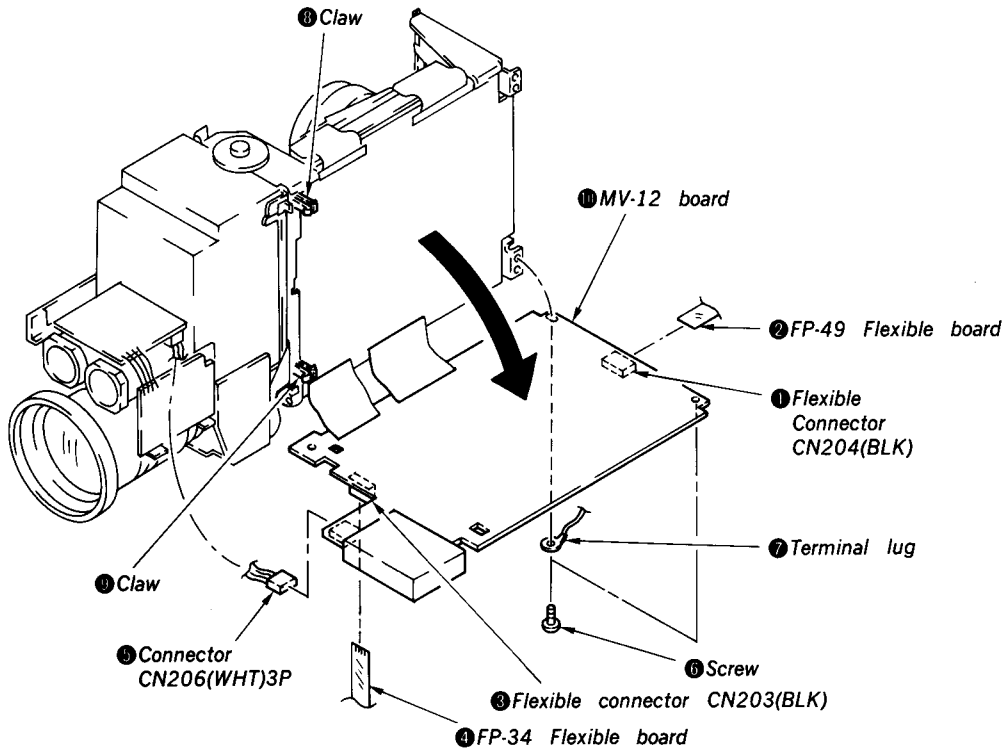
2-13. REMOVAL OF AW-4 BOARD

1) Remove the connector ❶ (CN901) and remove the connector ❷ (CN902).
2) Remove the screw ❸.
3) Opening the AW-4 board ❺, Be careful the claw ❹.



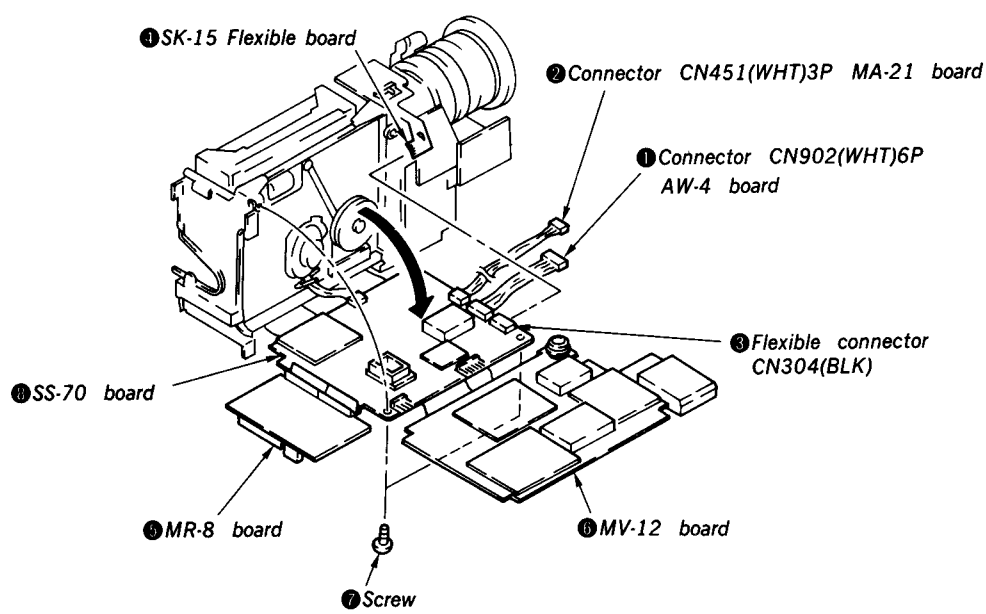
2-14. OPENING OF THE MV-12 BOARD

1) Remove the FP-49 flexible board ❷ from flexible connector CN204(BLK) ❶.
2) Remove the FP-34 flexible board ❹ from flexible connector CN203(BLK) ❸.
3) Remove the connector CN206(WHT) ❺.
4) Remove 2 screws ❻ and remove the terminal lug ❼.
5) Remove the claw ❽ and the claw ❾, and open the MV-12 board ❿ in the direction of arrow.



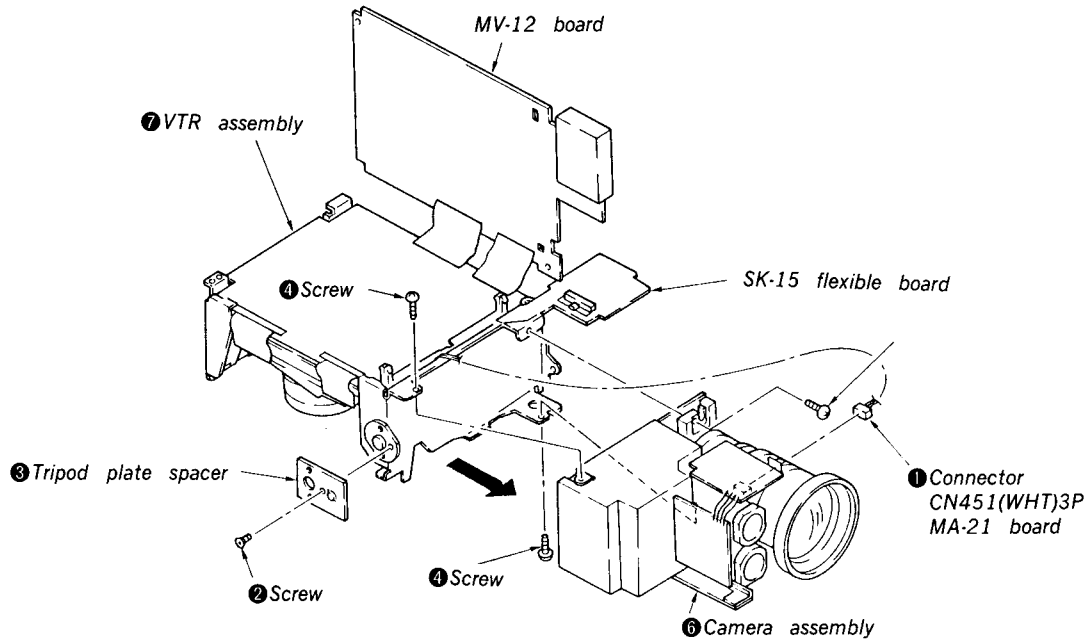
2-15. OPENING OF THE SS-70 BOARD

1) Remove the connector CN902(WHT)❶.
2) Perform step 2) of the "2-11. OPENING OF THE MA-21 BOARD".
3) Perform the "2-7. OPENING THE MR-8 BOARD".
4) Perform "2-14. OPENING THE MV-12 BOARD".
5) Remove two screws ❼.
6) Remove the SK-15 flexible board ❹ from flexible connector CN304(BLK) ❸.
7) Open the SS-70 board ❽ in the direction of arrow.



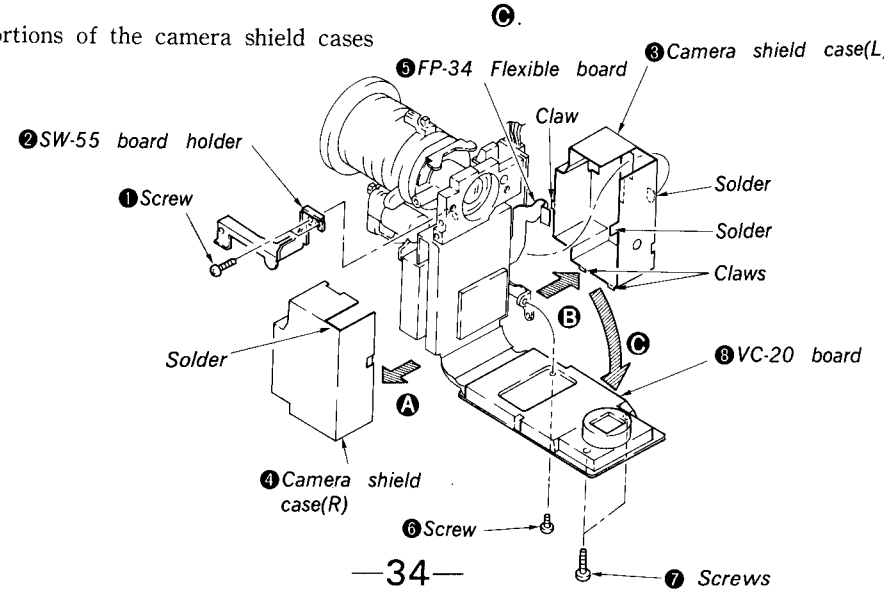
2-16. SEPARATION OF CAMERA ASSEMBLY AND VTR ASSEMBLY

1) Open the SK-15 flexible board, following the procedure mentioned in 2-12.
2) Open the MV-12 board, following the procedure mentioned in 2-14.
3) Remove the AW-4 board, following the procedure mentioned in 2-13.
4) Remove the connector CN451(WHT) ❶.
5) Remove the screw ❷.
6) Remove the tripod plate spacer ❸.
7) Remove two screws ❹.
8) Remove the screw ❺.
9) Separate the camera assembly ❻ from the VTR assembly ❼ in the direction of arrow.



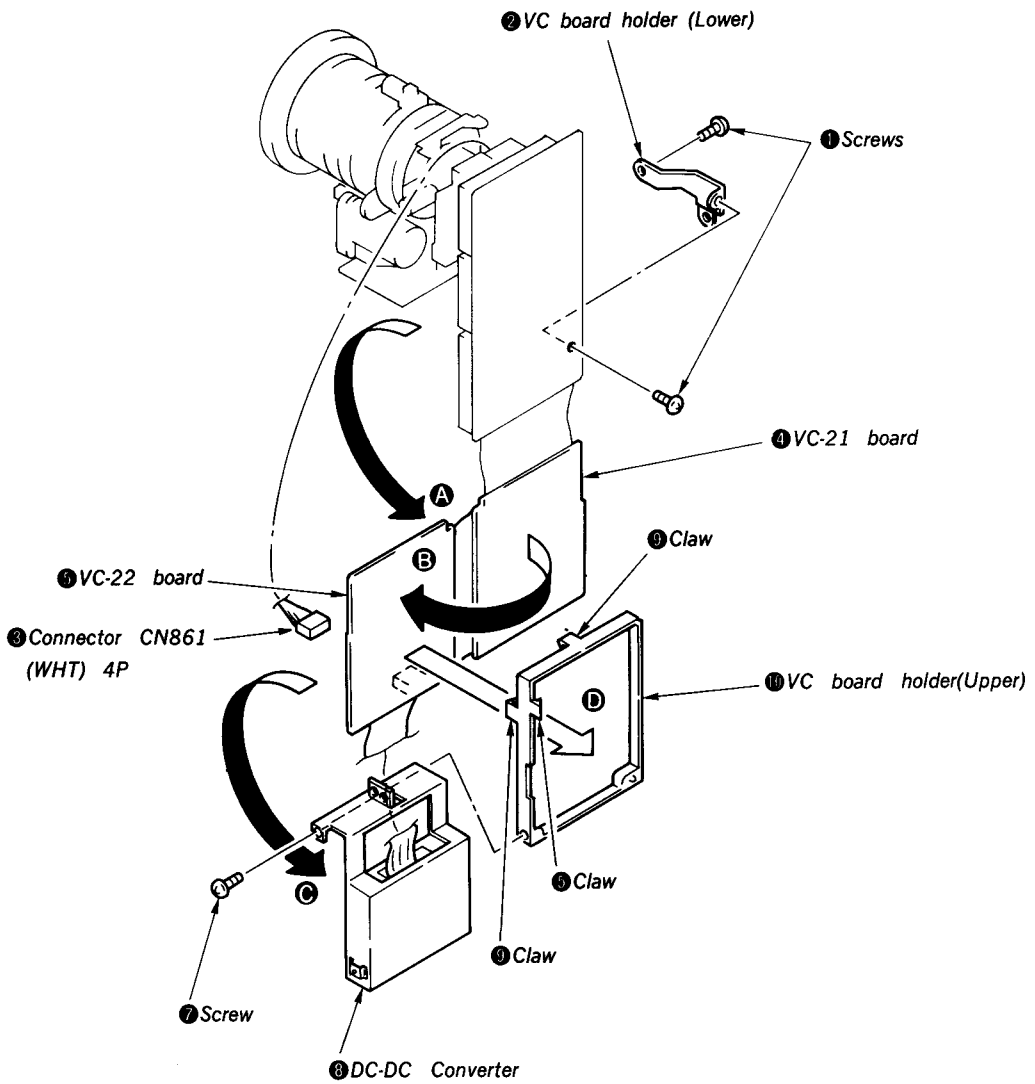
2-17. OPENING OF VC-20 BOARD

1) Separate the camera assembly and VTR assembly from each other following the procedure mentioned in 2-16.
2) Remove the SW-55 board, following the procedure mentioned in 2-8.
3) Remove the MA-21 board, following the procedure mentioned in 2-11.
4) Remove two screws ❶.
5) Remove the SW-55 board holder ❷.
6) Remove soldered portions of the camera shield cases ❸ (L) and ❹ (R).
7) Remove soldered portions of the camera shield cases (R) ❹.
8) Detach three claws of the camera shield case(L) ❸ and remove the camera shield case(R) ❹ in the direction of arrow Ⓐ.
9) Remove soldered portions of the flexible board FP-34 ❺ and camera shield case(L) ❸.
10) Remove the camera shield case(L) ❸ in the direction of arrow Ⓑ.
11) Remove the screw ❻.
12) Remove two screws ❼.
13) Open the VC-20 board ❽ in the direction of arrow Ⓒ.

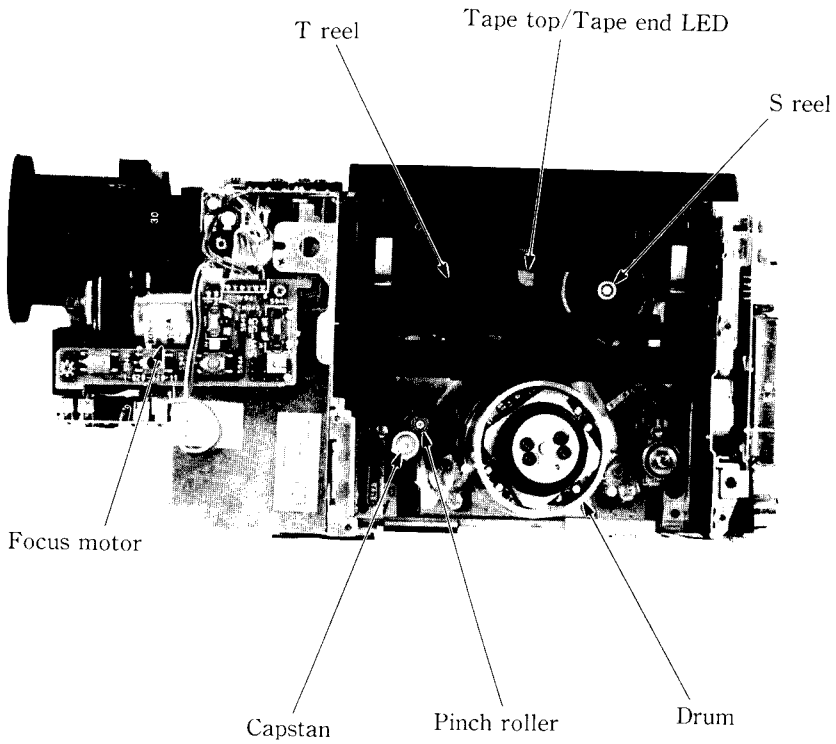


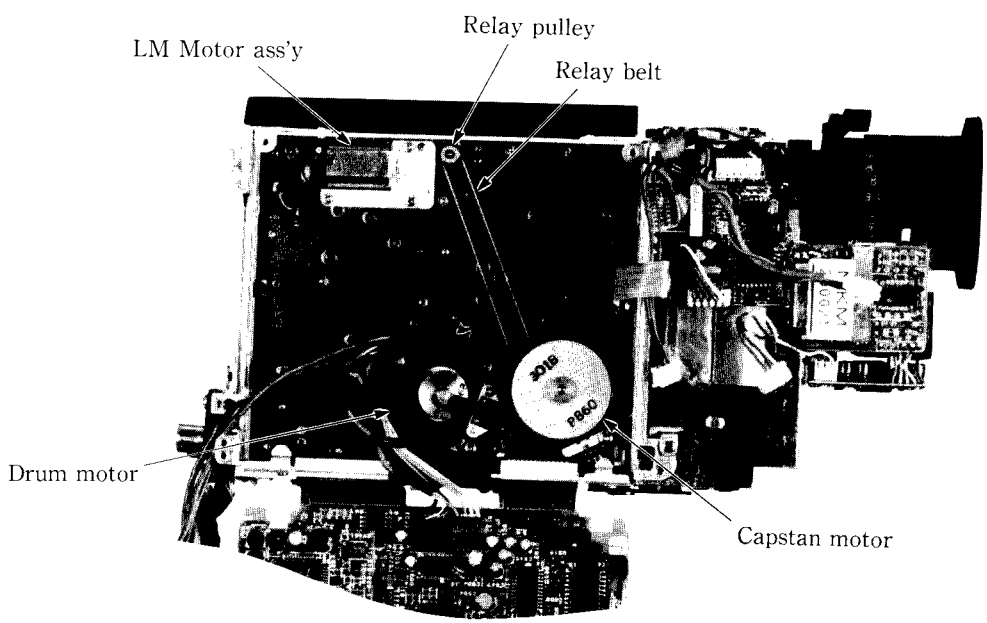
2-18. OPENING OF CAMERA BOARDS

1) Remove the camera shields(R), (L) according to the steps 1) through 10) in 2-17. OPENING OF VC-20 BOARD.
2) Remove two screws ❶, and then, the VC board holder(lower) ❷.
3) Remove connector CN861 (WHT) ❸.
4) Open the VC-21 board ❹ in the direction of arrow Ⓐ.
5) Detach the claw ❺ and open the VC-22 board ❻ in the direction of arrow Ⓑ.
6) Remove the screw ❼ and open the DC-DC converter ❽ in the direction of arrow Ⓒ.
7) Detach two claws ❾ and remove the VC board holder(upper) ❿ in the direction of arrow Ⓓ.



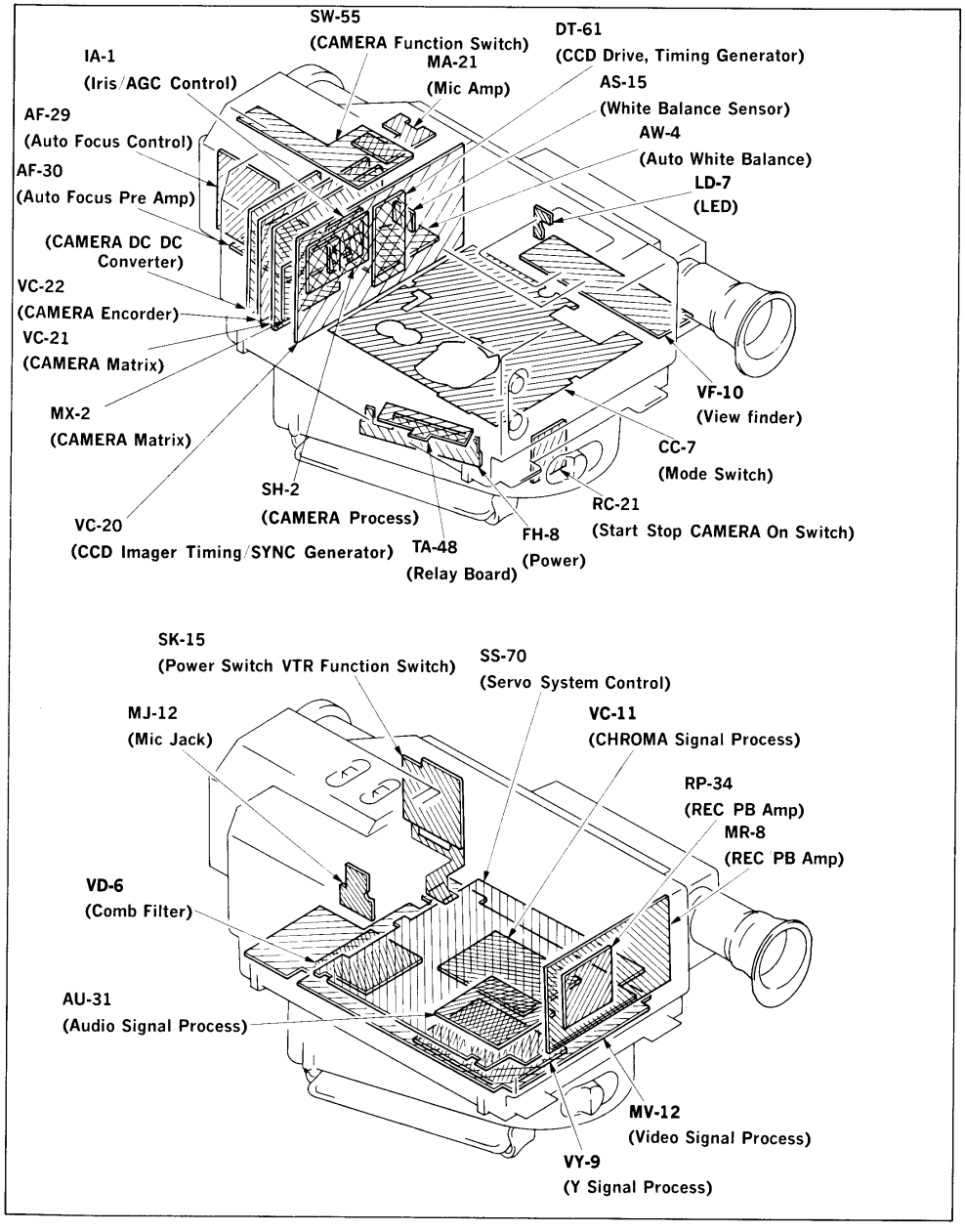
2-19. INTERNAL VIEWS



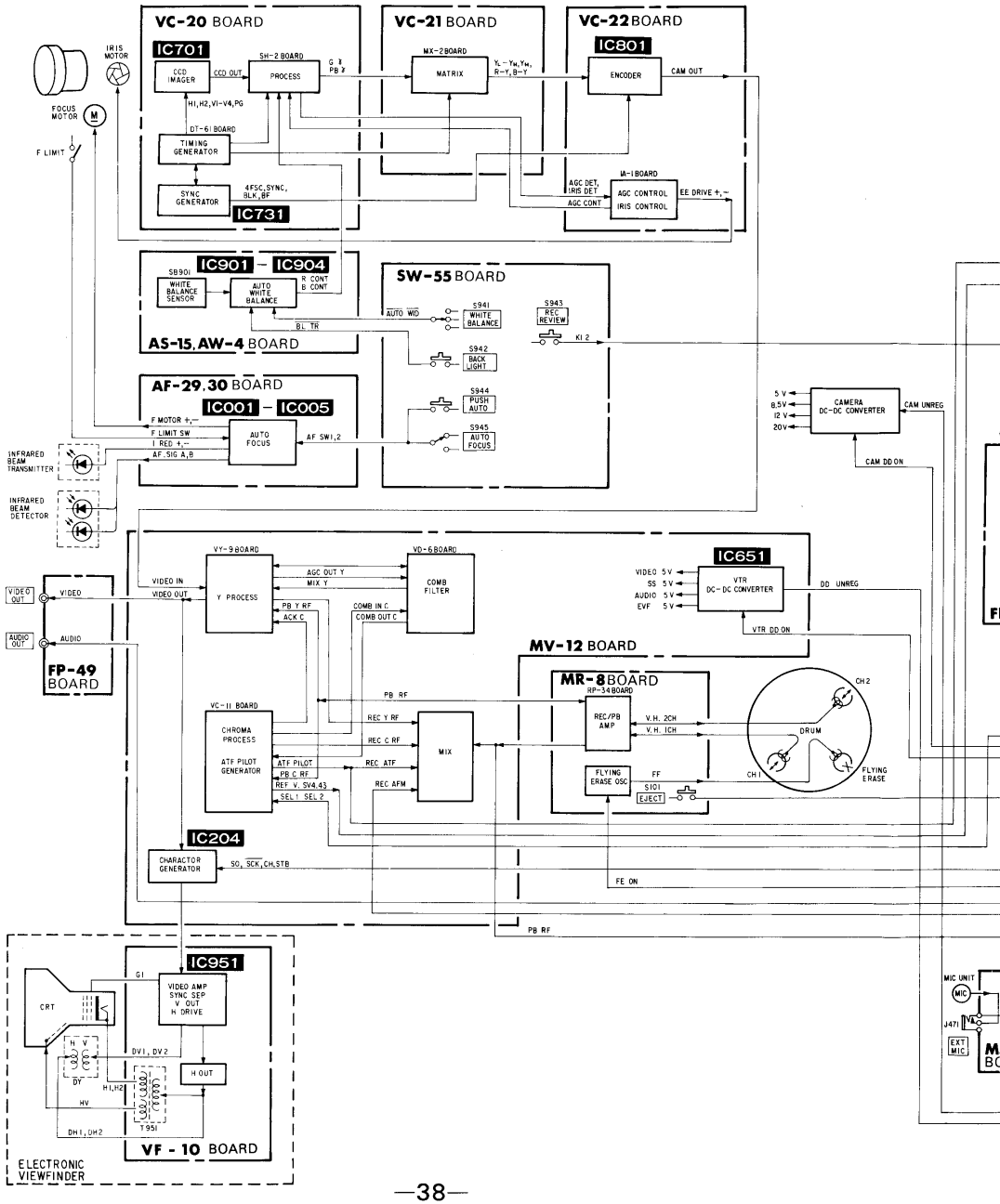


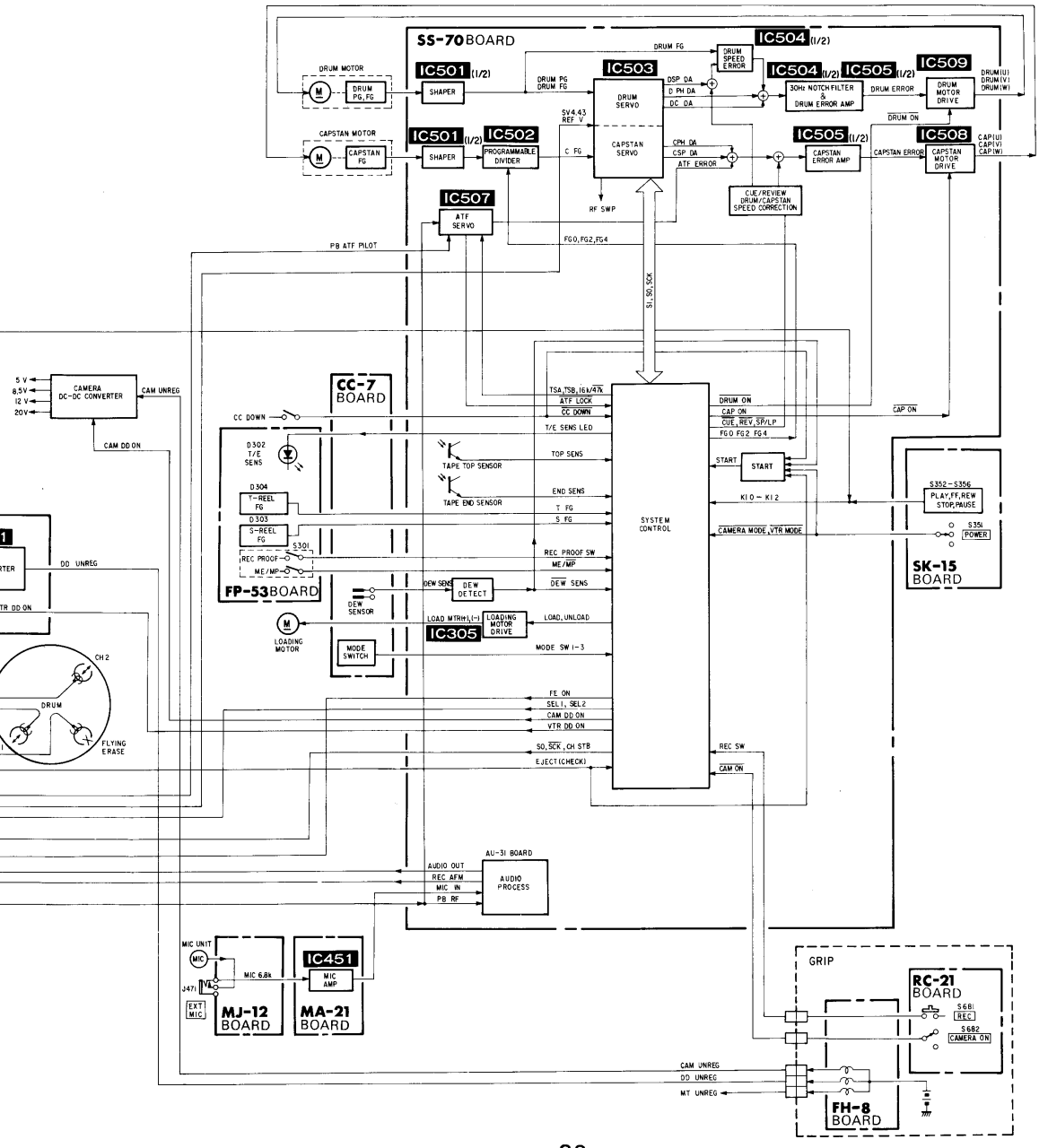
SECTION 3
DIAGRAMS

3-1. CIRCUIT BOARDS LOCATION

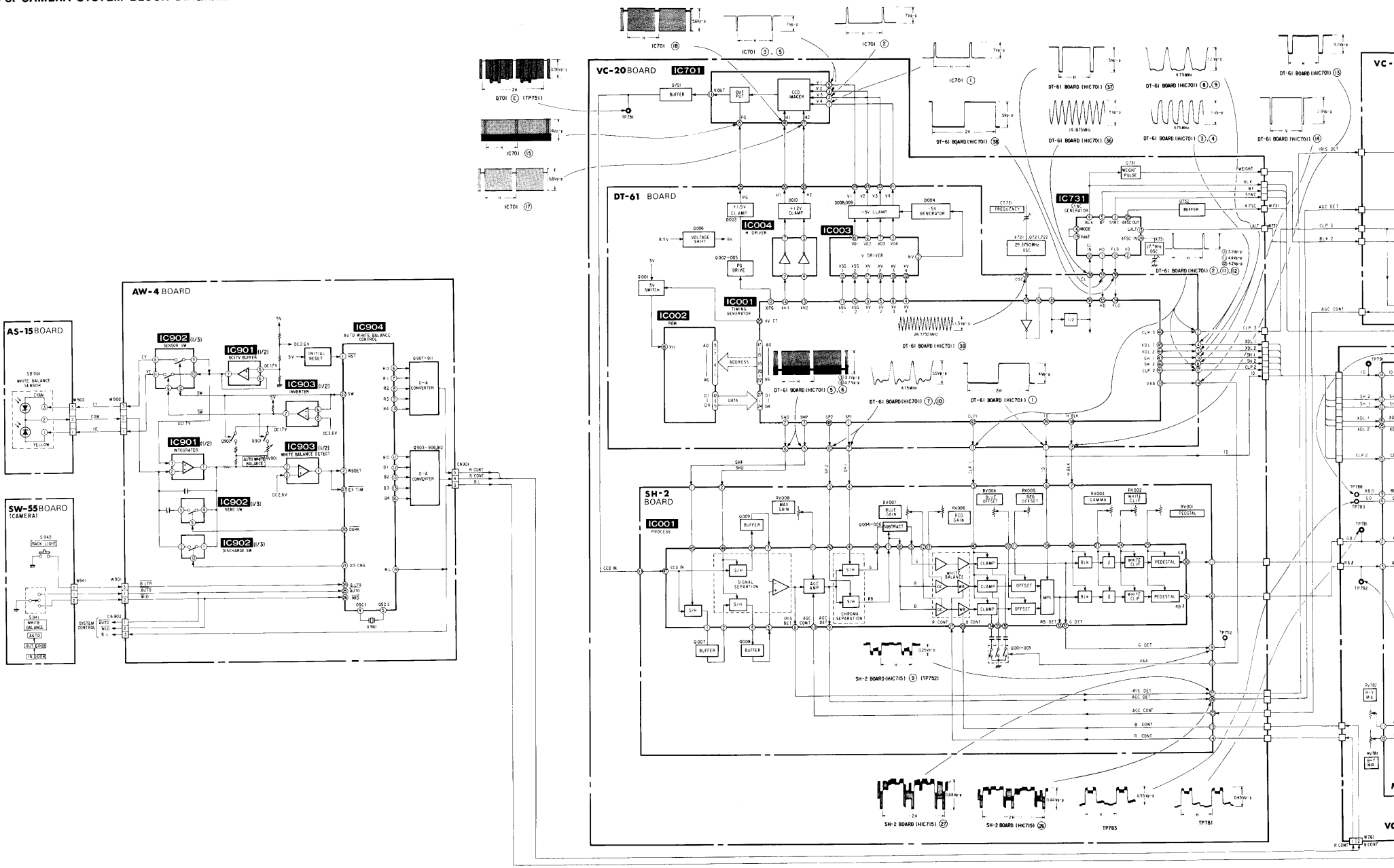


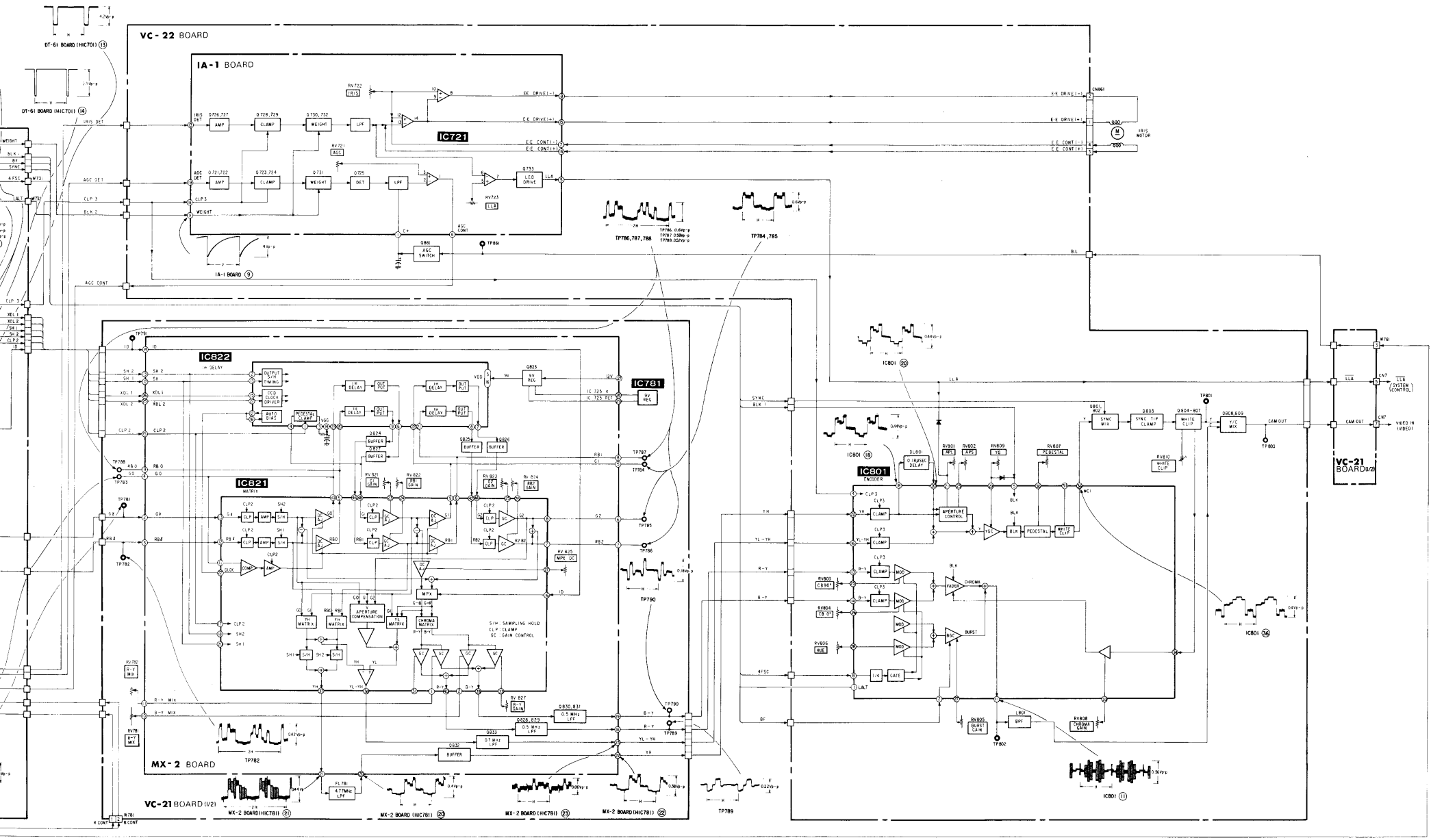
3-2. OVERALL BLOCK DIAGRAM



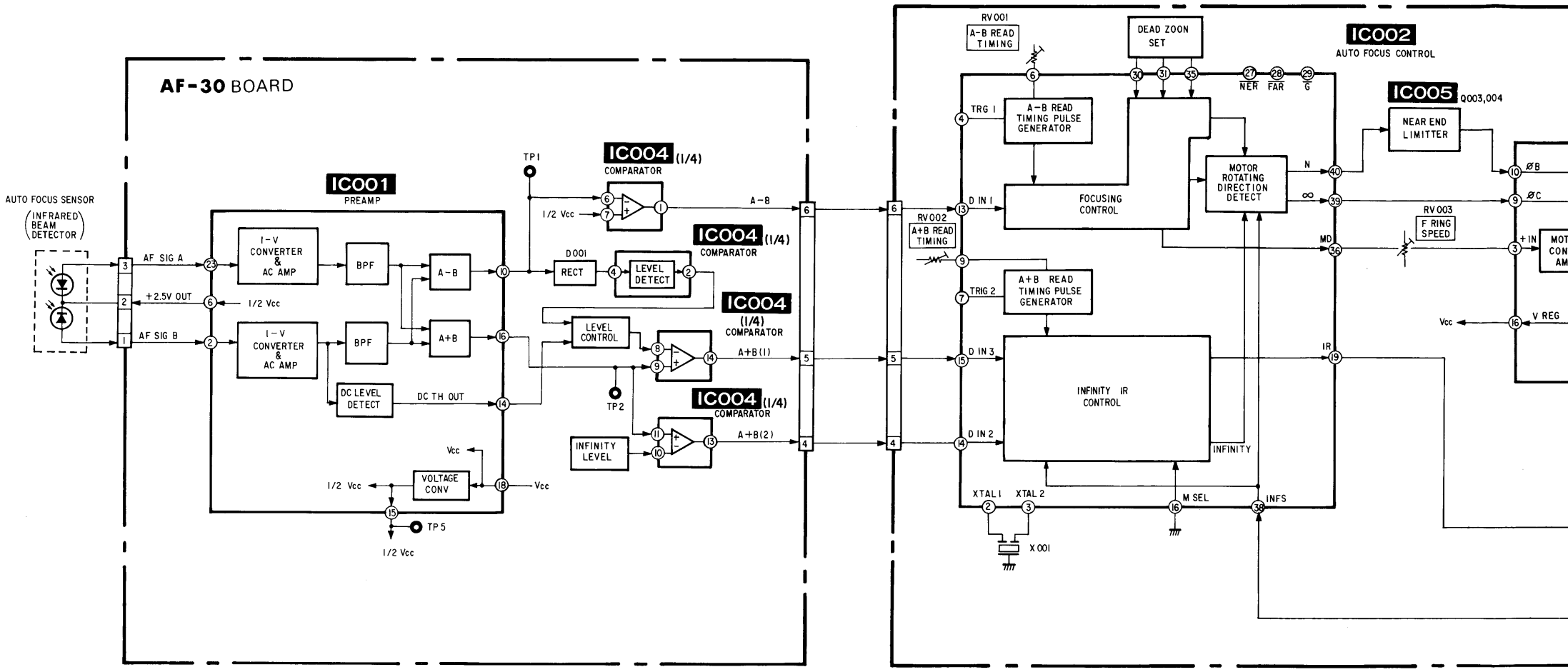

SS-70 BOARD
IC504 (1/2)
DRUM MOTOR
IC501 (1/2)
DRUM FG
IC503
DRUM SPEED ERROR
IC504 (1/2)
IC505 (1/2)
IC509
DRUM PG, FG
SHAPER
DRUM PG
DRUM FG
DRUM SERVO
DSP DA
D PH DA
DC DA
30Hz NOTCH FILTER & DRUM ERROR AMP
DRUM ERROR
DRUM MOTOR DRIVE
DRUM(U)
DRUM(V)
DRUM(W)
SV4.43 REF V
DRUM ON
CAPSTAN MOTOR
IC501 (1/2)
IC502
IC505 (1/2)
IC508
CAPSTAN FG
SHAPER
PROGRAMMABLE DIVIDER
C FG
CAPSTAN SERVO
CPH DA
CSP DA
ATF ERROR
CAPSTAN ERROR AMP
CAPSTAN ERROR
CAPSTAN MOTOR DRIVE
CAP(U)
CAP(V)
CAP(W)
IC507
ATF SERVO
RF SWP
CUE/REVIEW DRUM/CAPSTAN SPEED CORRECTION
PB ATF PILOT
FG0, FG2, FG4
SI, SO, SCK
5 V
8.5V
12 V
20V
CAMERA DC-DC CONVERTER
CAM UNREG
CAM DD ON
CC-7 BOARD
CC DOWN
TSA, TSB, 16H/47k
ATF LOCK
CC DOWN
T/E SENS LED
DRUM ON
CAP ON
CUE, REV, SP/LP
FG0 FG2 FG4
CAP ON
D302 T/E SENS
TAPE TOP SENSOR
TOP SENS
START
START
D304 T-REEL FG
TAPE END SENSOR
END SENS
S352 – S356
PLAY, FF, REW STOP, PAUSE
D303 S-REEL FG
T FG
S FG
KI0 – KI2
S301
REC PROOF
ME/MP
CAMERA MODE, VTR MODE
S351
POWER
FP-53 BOARD
SK-15 BOARD
REC PROOF SW
ME/MP
DEW SENS
DEW DETECT
DEW SENS
DEW SENSOR
LOAD MTR(+), (–)
LOADING MOTOR DRIVE
LOAD, UNLOAD
IC305
LOADING MOTOR
MODE SW 1-3
MODE SWITCH
SYSTEM CONTROL
DD UNREG
TR DD ON
CH2
DRUM
FLYING ERASE
FE ON
SEL1, SEL2
CAM DD ON
VTR DD ON
SO, SCK, CH STB
EJECT (CHECK)
REC SW
CAM ON
AU-31 BOARD
AUDIO OUT
REC AFM
MIC IN
PB RF
AUDIO PROCESS
MIC UNIT
MIC
MIC 6.8k
IC451
MIC AMP
J471
EXT MIC
MJ-12 BOARD
MA-21 BOARD
GRIP
RC-21 BOARD
S681
REC
S682
CAMERA ON
CAM UNREG
DD UNREG
MT UNREG
FH-8 BOARD

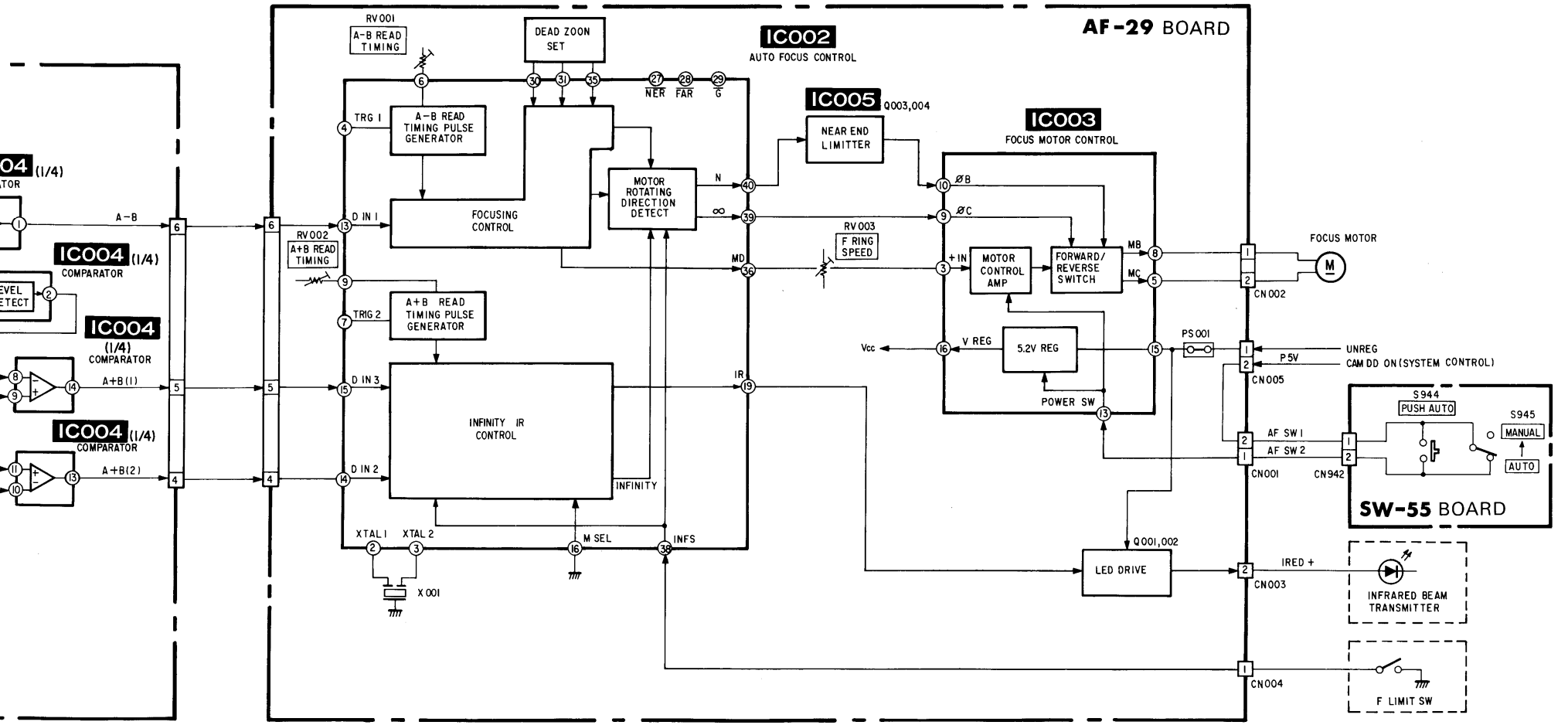
3-3. CAMERA SYSTEM BLOCK DIAGRAM



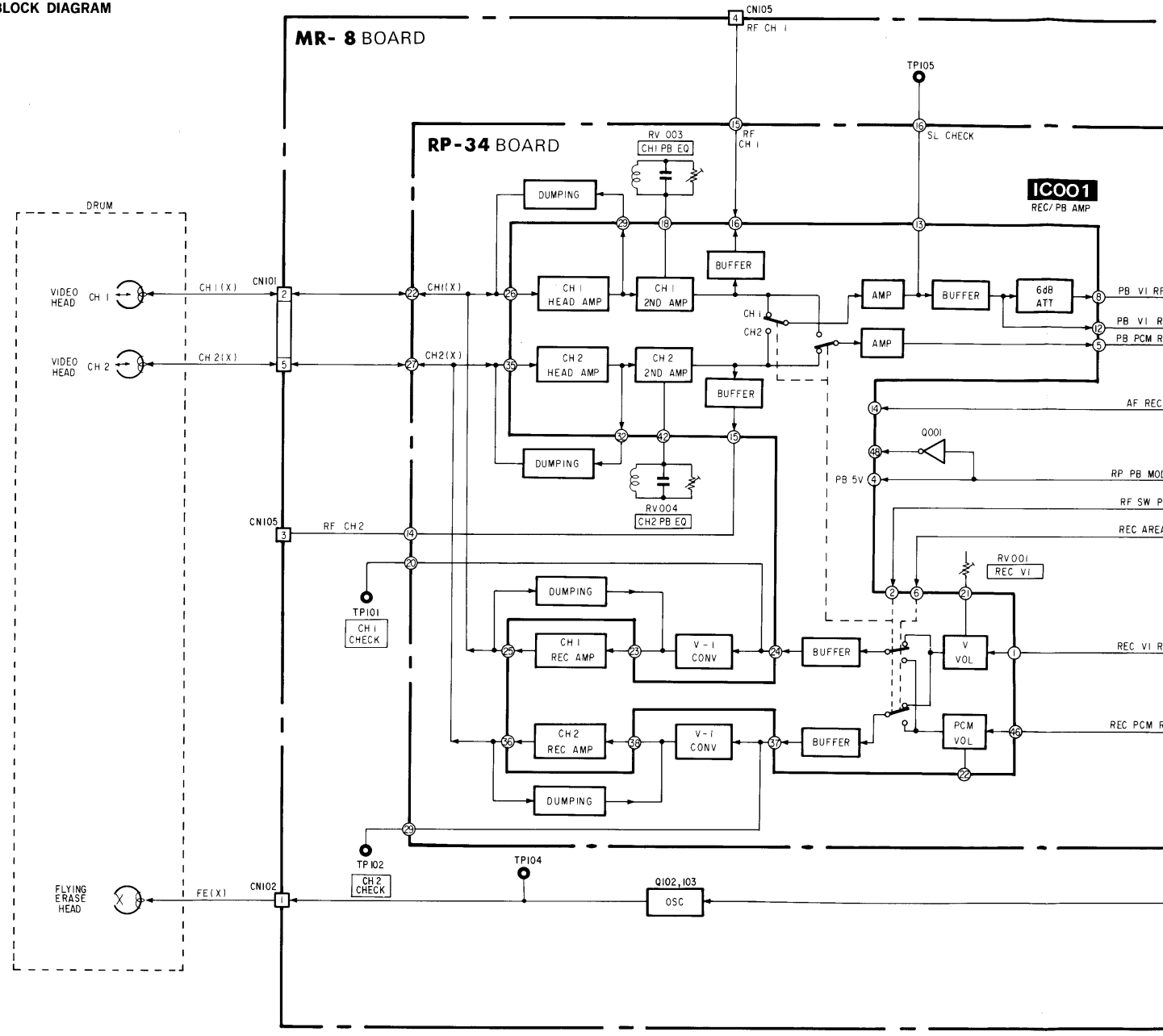

VC-22 BOARD
IA-1 BOARD
IC721
IC822
IC821
IC781
IC801
MX-2 BOARD
VC-21 BOARD (1/2)
VC-21 BOARD (2/2)
DT-61 BOARD (HIC701) (13)
DT-61 BOARD (HIC701) (14)
IA-1 BOARD (9)
MX-2 BOARD (HIC781) (21)
MX-2 BOARD (HIC781) (24)
MX-2 BOARD (HIC781) (23)
MX-2 BOARD (HIC781) (22)
IC801 (20)
IC801 (18)
IC801 (36)
IC801 (11)
TP786,787,788
TP784,785
TP782
TP789
TP790
IRIS MOTOR
CAM OUT
VIDEO IN (VIDEO)
LLA (SYSTEM CONTROL)

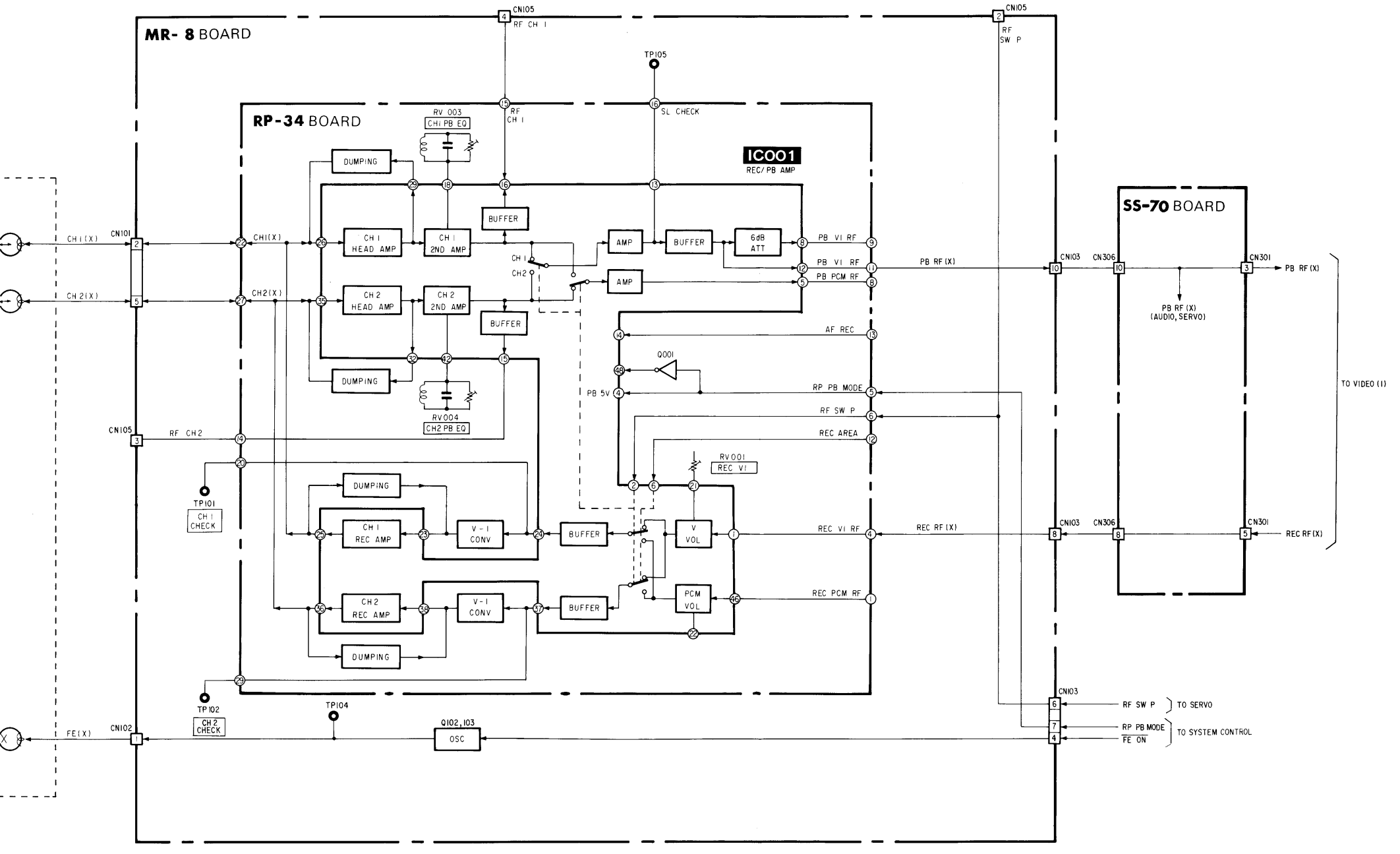
3-4. AUTO FOCUS BLOCK DIAGRAM



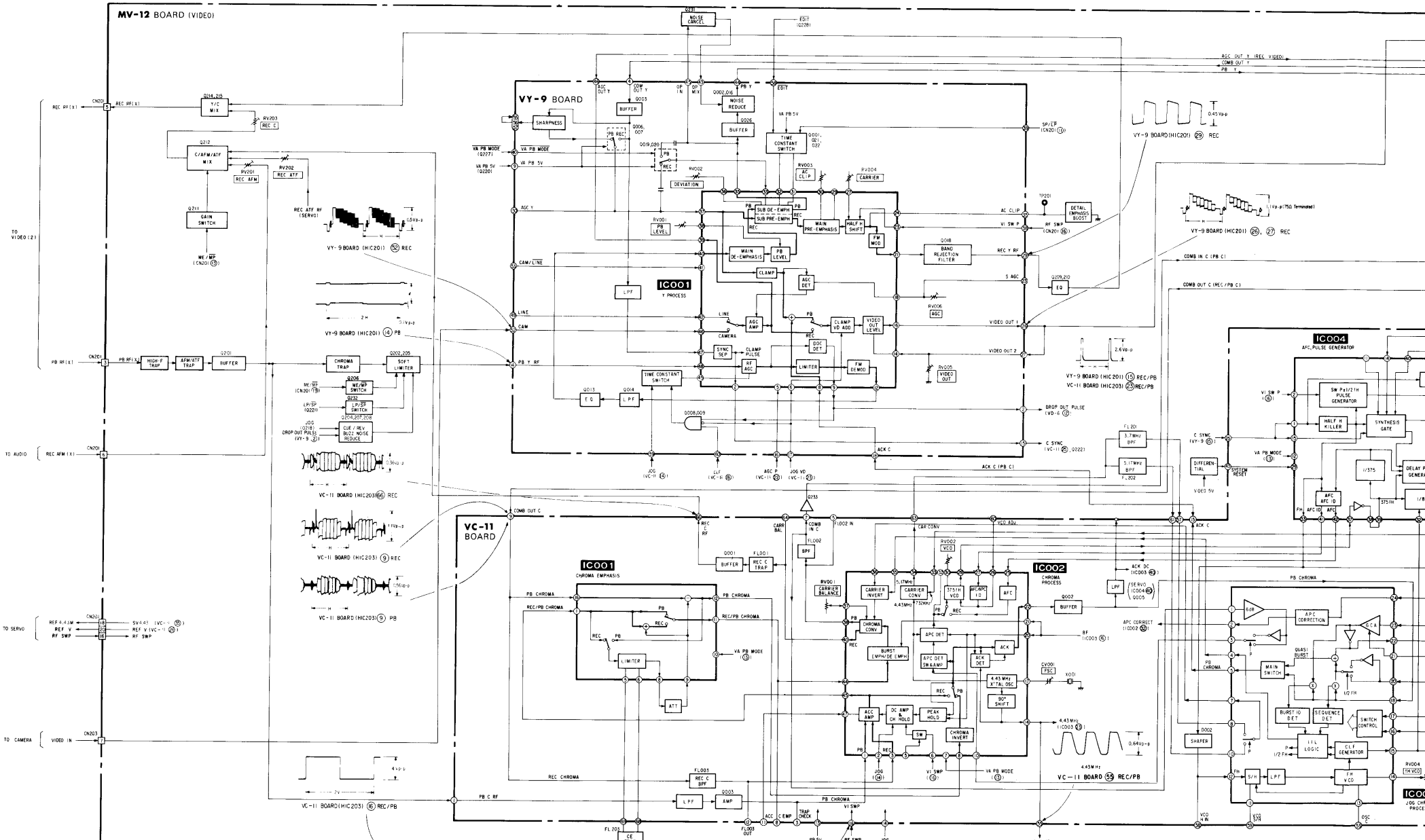

AF-29 BOARD
IC002
AUTO FOCUS CONTROL
IC005 Q003,004
IC003
FOCUS MOTOR CONTROL
RV001
A-B READ TIMING
DEAD ZOON SET
NER
FAR
G
TRG 1
A-B READ TIMING PULSE GENERATOR
FOCUSING CONTROL
MOTOR ROTATING DIRECTION DETECT
NEAR END LIMITTER
RV002
A+B READ TIMING
RV003
F RING SPEED
TRIG 2
A+B READ TIMING PULSE GENERATOR
INFINITY IR CONTROL
INFINITY
XTAL 1
XTAL 2
M SEL
INFS
X001
MOTOR CONTROL AMP
FORWARD/ REVERSE SWITCH
5.2V REG
V REG
POWER SW
LED DRIVE
Q001,002
FOCUS MOTOR
CN002
PS001
UNREG
CAM DD ON (SYSTEM CONTROL)
P5V
CN005
AF SW 1
AF SW 2
CN001
CN942
S944
PUSH AUTO
S945
MANUAL
AUTO
SW-55 BOARD
IRED +
CN003
INFRARED BEAM TRANSMITTER
CN004
F LIMIT SW
IC004 (1/4)
COMPARATOR
A-B
A+B(1)
A+B(2)

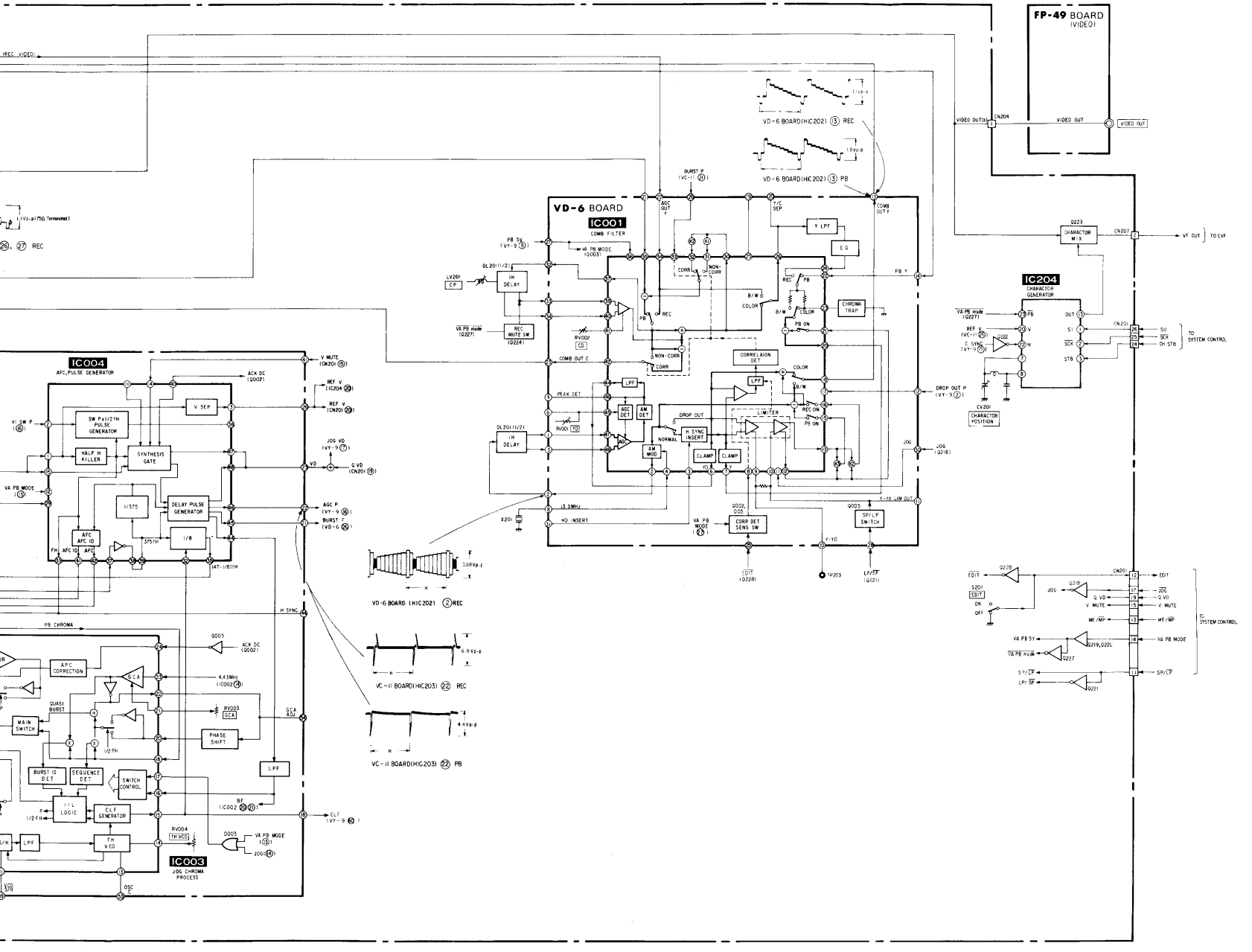
3-5. VIDEO (1) SYSTEM BLOCK DIAGRAM



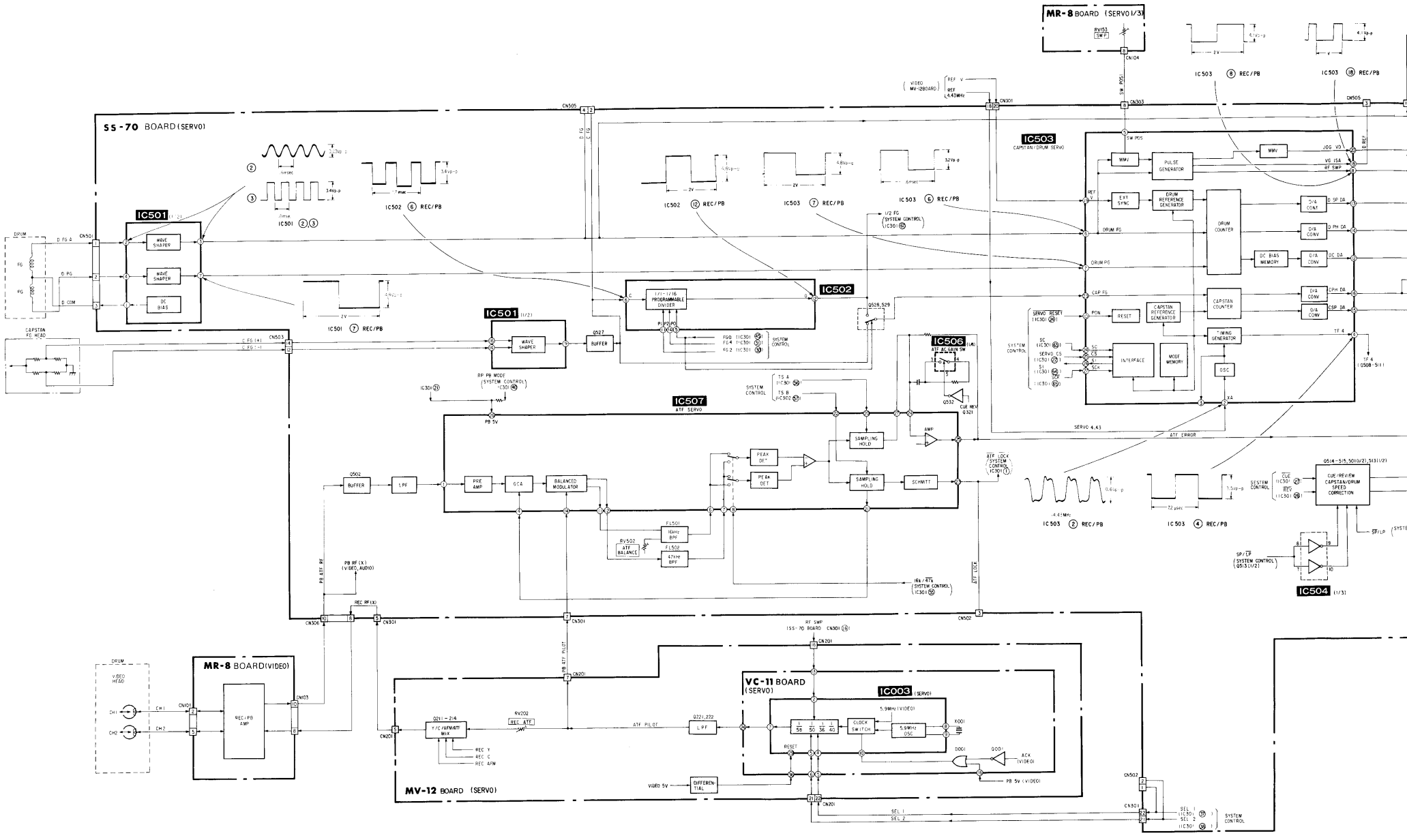

MR- 8 BOARD
RP-34 BOARD
IC001
REC/PB AMP
SS-70 BOARD
CN105
RF CH 1
RF SW P
TP105
SL CHECK
RV 003
CH1 PB EQ
DUMPING
BUFFER
CH1 HEAD AMP
CH1 2ND AMP
AMP
6dB ATT
PB VI RF
PB PCM RF
CH1(X)
CH2(X)
CN101
CH2 HEAD AMP
CH2 2ND AMP
AF REC
Q001
PB 5V
RP PB MODE
RF SW P
REC AREA
RV004
CH2 PB EQ
RF CH2
RV001
REC VI
TP101
CH1 CHECK
CH1 REC AMP
V-I CONV
V VOL
REC VI RF
CH2 REC AMP
PCM VOL
REC PCM RF
TP102
CH2 CHECK
TP104
CN102
FE(X)
Q102, 103
OSC
CN103
CN306
CN301
PB RF(X)
PB RF (X) (AUDIO, SERVO)
REC RF(X)
TO VIDEO (1)
RF SW P
TO SERVO
RP PB MODE
FE ON
TO SYSTEM CONTROL

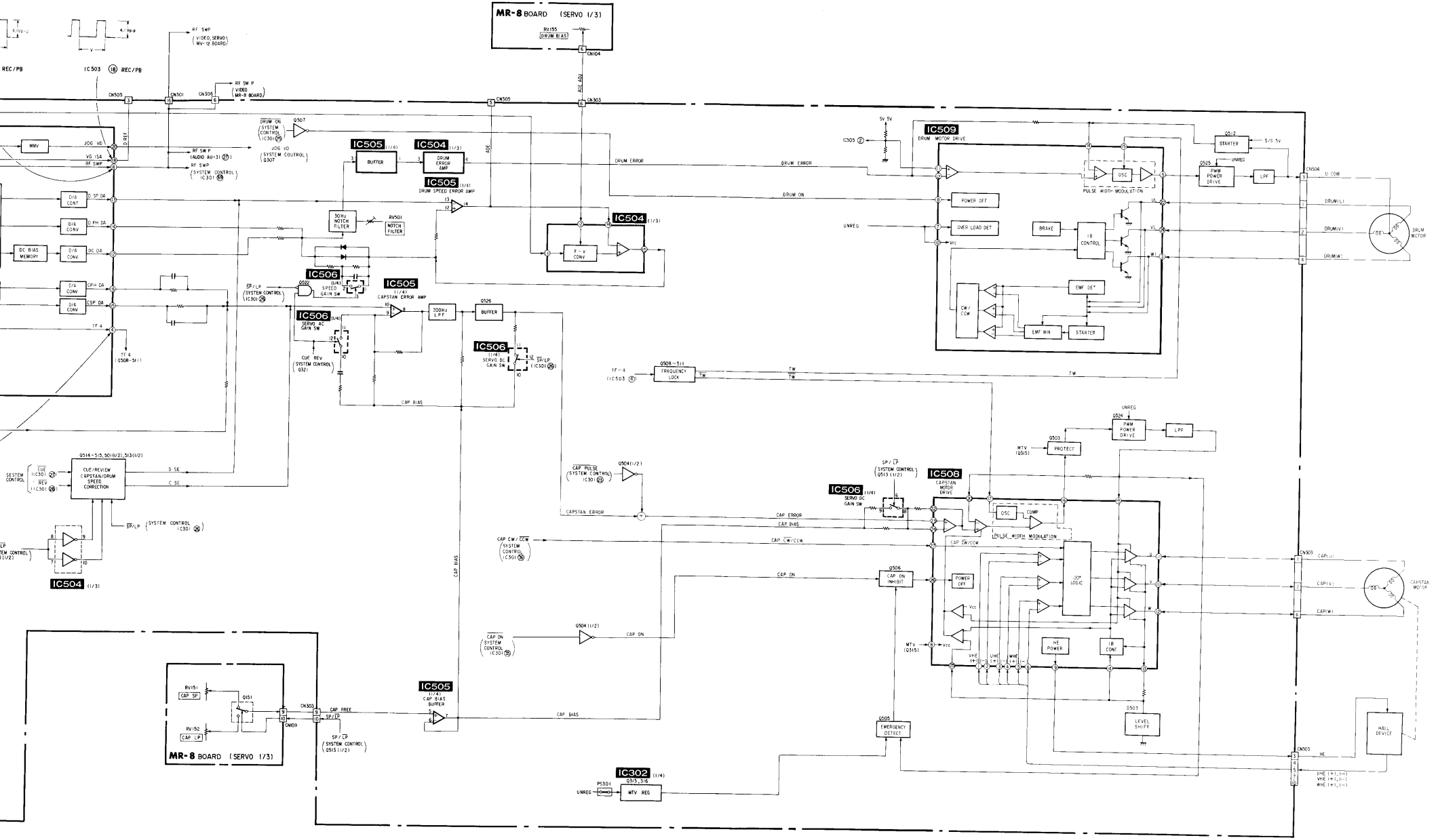
3-6. VIDEO (2) SYSTEM BLOCK DIAGRAM



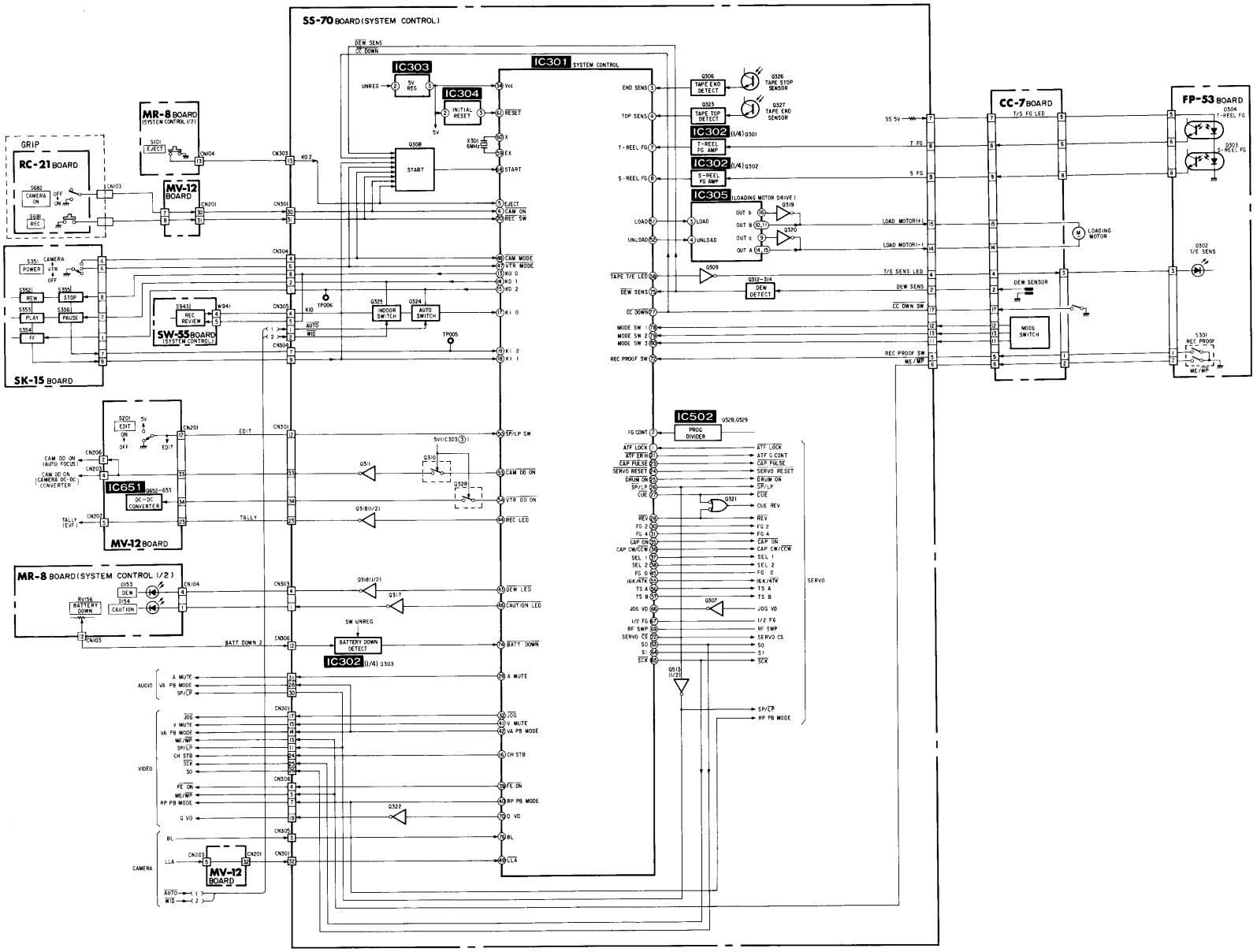

FP-49 BOARD
(VIDEO)
VD-6 BOARD
IC001
COMB FILTER
IC004
AFC, PULSE GENERATOR
IC003
JOG CHROMA PROCESS
IC204
CHARACTER GENERATOR
VD-6 BOARD (HIC202) ③ REC
VD-6 BOARD (HIC202) ③ PB
VD-6 BOARD (HIC202) ② REC
VC-II BOARD (HIC203) ㉒ REC
VC-II BOARD (HIC203) ㉒ PB
VIDEO OUT
TO EVF
TO SYSTEM CONTROL
CHARACTOR POSITION
EDIT
JOG
V MUTE
Q VD
ME/MP
VA PB MODE
SP/LP

3-7. SERVO BLOCK DIAGRAM




MR-8 BOARD (SERVO 1/3)
RV155 DRUM BIAS
CN104
IC509 DRUM MOTOR DRIVE
IC505 (1/4) BUFFER
IC504 (1/3) DRUM ERROR AMP
IC505 (1/4) DRUM SPEED ERROR AMP
IC504 (1/3) F-V CONV
IC506 (1/4) SPEED GAIN SW
IC505 (1/4) CAPSTAN ERROR AMP
IC506 (1/4) SERVO AC GAIN SW
IC506 (1/4) SERVO DC GAIN SW
IC508 CAPSTAN MOTOR DRIVE
IC504 (1/3)
IC505 (1/4) CAP BIAS BUFFER
IC302 (1/4) MTV REG
CUE/REVIEW CAPSTAN/DRUM SPEED CORRECTION
DRUM ERROR
DRUM ON
CAPSTAN ERROR
CAP ERROR
CAP BIAS
CAP CW/CCW
CAP ON
CAP FREE
TW
UNREG
PULSE WIDTH MODULATION
FREQUENCY LOCK
EMERGENCY DETECT
LEVEL SHIFT
HALL DEVICE
DRUM MOTOR
CAPSTAN MOTOR
MR-8 BOARD (SERVO 1/3)

3-8. SYSTEM CONTROL BLOCK DIAGRAM



3-9. TER

Terminal No.	
1	
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3-9. TERMINAL FUNCTIONS OF SYSTEM CONTROLLER IC301 (MB88551)

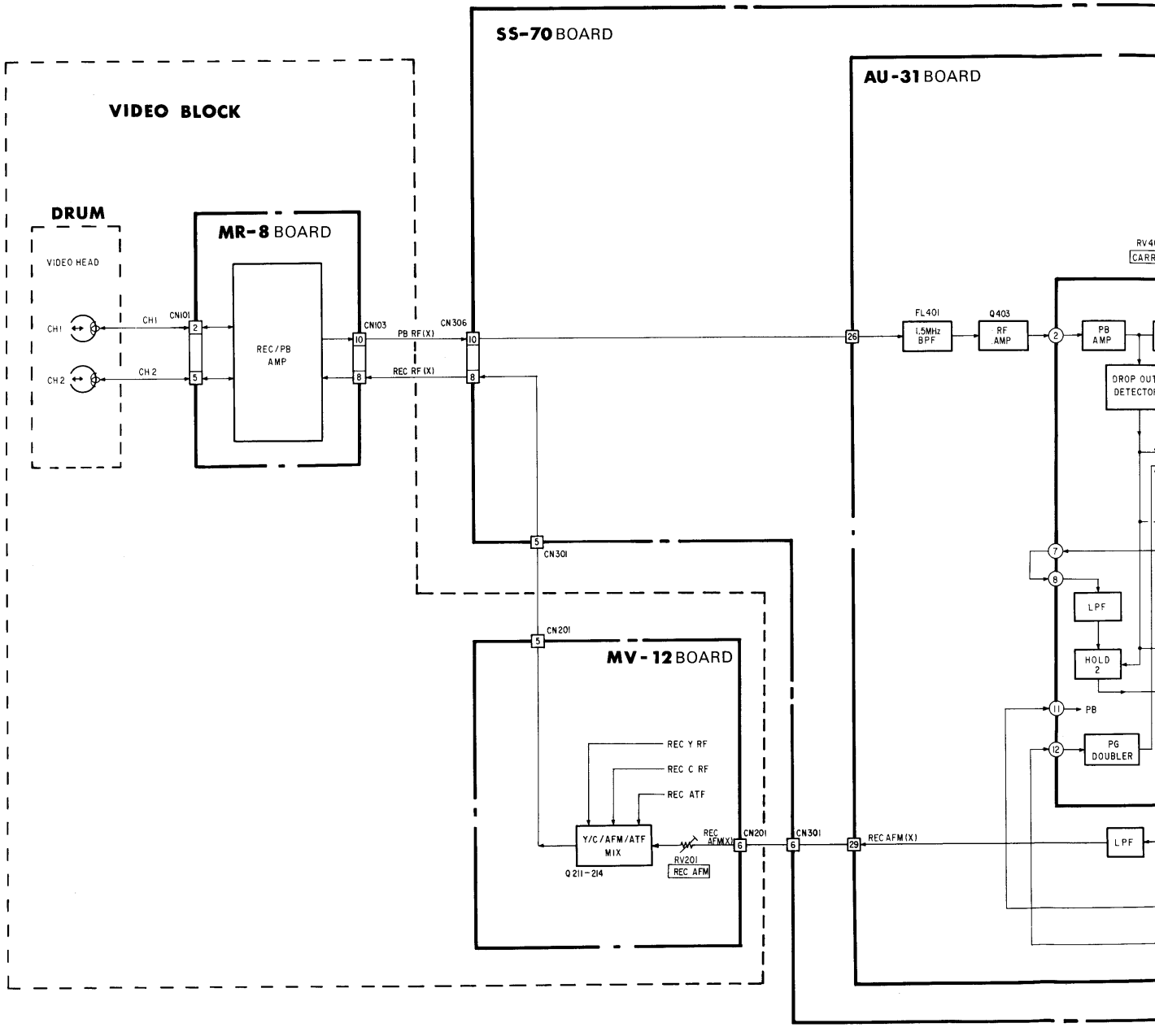
Terminal No.	Signal	I/O	Terminal Function
1	ATF LOCK	I	"L" when ATF phase servo lock.
2	STIL PLS	I	For bar noise position control when still pulses are still
3	END SENS	I	"L" when end sensor input is at end
4	TOP SENS	I	"L" when top sensor input is at top
5	EJCT	I	"L" in EJECT mode
6	CAM P ON	I	"L" when the CAMERA POWER ON switch is turned ON.
7	T REEL FG	I	REEL FG on the take-up side. For tap sag detection
8	S REEL FG	I	REEL FG on the supply side. For tape slack detection
9	TEST	I	TEST terminal. "L" in TEST mode
10	A Vss	—	Connect to GND
11	A VR (—)	—	
12	A Vcc	—	EVER+5V
13	KO 0	O	KEY MATRIX output signal. Reads an "L" output timing with KI.
14	KO 1	O	
15	KO 2	O	
16	CH STB	O	Strobe signal for character generator IC(μPD6150C)
17	KI 0	I	KEY MATRIX input signal. "L" when a desired button is pressed.
18	KI 1	I	
19	KI 2	I	
20	REC SW	I	REC key input. "L" when REC button is pressed.
21	ATF ERH	O	"L" in EJECT, STBY or PB•P mode.
22	SERVO CS	O	Communicating with servo IC(CX20035), "L" during data transmit.
23	CAP PLS	O	"L" in FF/REW mode or transmit of a capstan PWM signal.
24	SERVO RESET	O	Initial reset pulse to CX20035(servo IC)
25	DRUM ON	O	DRUM ON/OFF. "L" for DRUM ON
26	SP/LP	O	"L" in SP mode, "H" in LP mode
27	CUE	O	"L" in CUE mode
28	REV	O	"L" in REVIEW mode
29	A MUTE	O	MUTE when AUDIO MUTE signal is at "H"
30	FG2	O	Frequency division control of the CAPSTAN FG counter
31	FG4	O	Frequency division control of the CAPSTAN FG counter
32	JOG	O	"L" in jog mode
33	N•C	—	Not used.
34	Vcc	—	EVER+5V power supply terminal
35	CAP ON	O	"L" when the capstan motor is turned on
36	CAP CCW/CW	O	"L" when the capstan motor runs in the FOW direction
37	SEL1	O	Determines Ref•f of ATF.
38	SEL2	O	
39	FE ON	O	"L" when flowing a current to the flying erase head
40	RP PB MODE	O	RP AMP PB/REC select signal. "H" in PB or EE mode

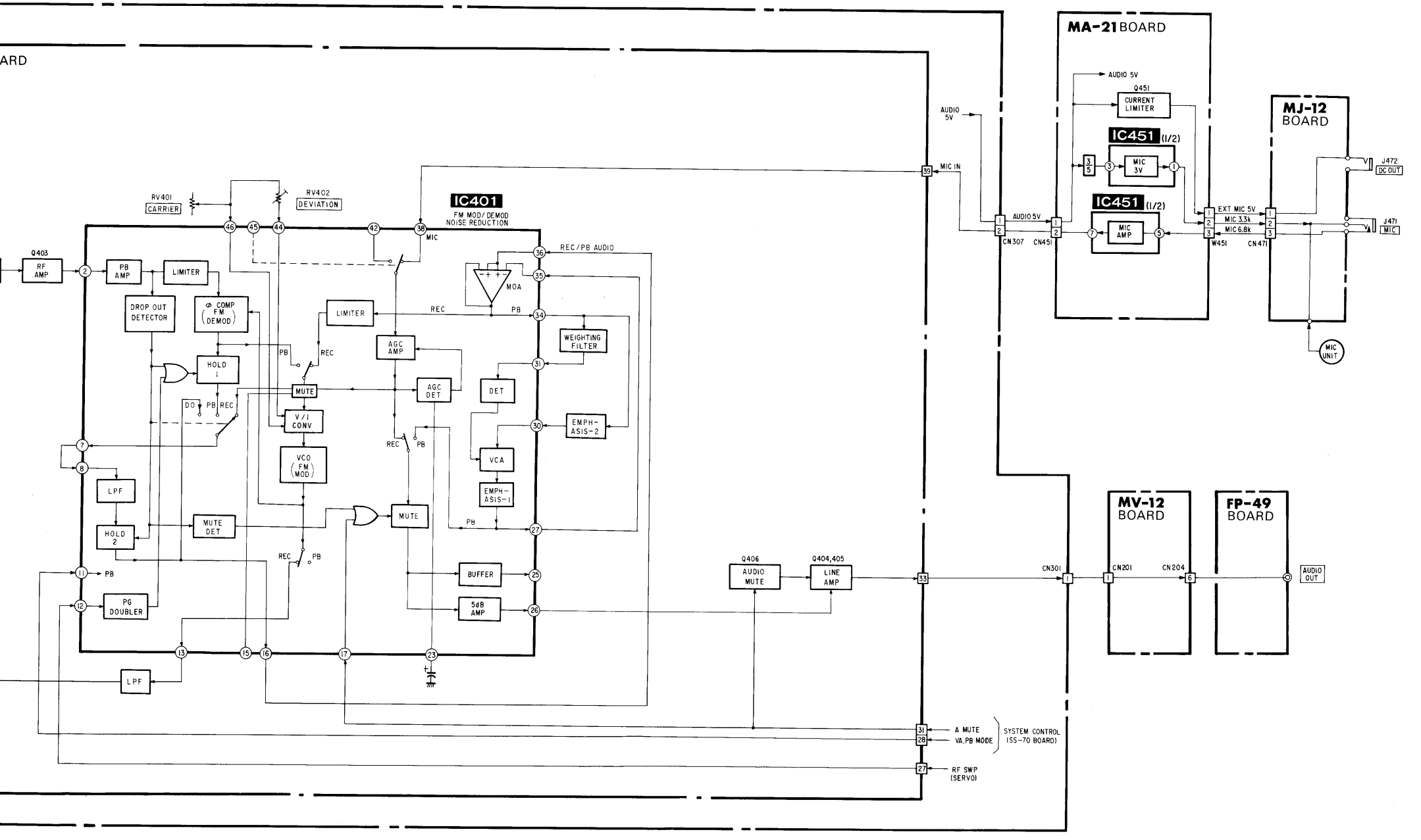
Ref•f	f1	f2	f3	f4
SEL1	H	L	H	L
SEL2	H	H	L	L

Terminal No.	Signal	I/O	Terminal Function
41	V MUTE	O	MUTE when VIDEO MUTE signal is at "H"
42	VA PB MUTE	O	VIDEO AUDIO PB MUTE
43	DEW LED	O	LED for DEW detect
44	REC LED	O	LED for REC mode. For lighting the tarry LED on the front of EVF.
45	FGO	O	Frequency division control of the capstan FG counter
46	CAUTION LED	O	For lighting the external LED. Lights up at "L"
47	VTR MODE	I	Mode selector switch input. "L" in VTR mode.
48	CAM MODE	I	Mode selector switch input. "L" in CAMERA mode.
49	LLA	I	LOW LIGHT ALARM signal. "L" in LOW LIGHT.
50	SP/LP SW	I	LP/SP selector switch
51	LOAD	O	Loading motor control
52	UN LOAD	O	
53	CA DD ON	O	Power on when camera power supply control is at "L"
54	VTR DD ON	O	Power on when VTR power supply control is at "L"
55	16 K/47 K	O	ATF BPF select signal. 16kHz beats increased at "H"
56	TS A	O	Hold when ATF error SAMPLE HOLD is at "H" (capstan phase error)
57	TS B	O	Hold when ATF error SAMPLE HOLD is at "H" (used for ATF LOCK signal)
58	TAPE T/E LED	O	LED drive signal for tape top and end sensors
59	EX	I	Clock (6MHz) oscillator connection
60	X	O	
61	RESET	I	Reset at "L"
62	NC	—	Not used
63	SO BUS	O	Serial data Transmit to the servo IC(CX20035) and character generator IC(μPD6105).
64	SI BUS	I	Receives status information from the servo IC(CX20035) as a serial signal.
65	SCK BUS	O	SERIAL CLOCK communication clock
66	JOG VD	I	Received from the servo IC(CX20035)
67	1/2FG	O	Signal whose cycle is double CAP FG
68	START	I	Microcomputer standby reset signal
69	RF SWP	I	RF switching pulse input
70	Q V D	O	Dummy VD(reverse) signal to the video block
71	Vss	—	GND terminal
72	REC PROOF	I	REC PROOF switch. "L" in a cassette erroneous erasion preventive state
73	NC	—	Not used
74	BAT DWN	I	"L" in BATTERY DOWN
75	DEW SENS	I	"L" at occurrence of DEW
76	BL	I	Backlight input. "H" when backlighted
77	CC DOWN	I	Cassette compartment up with the CASSETTE COMPARTMENT DOWN switch at "H", and DOWN at "L".
78	MODE SW 1	I	Mode switches(3-bit configuration)
79	MODE SW 2	I	
80	MODE SW 3	I	

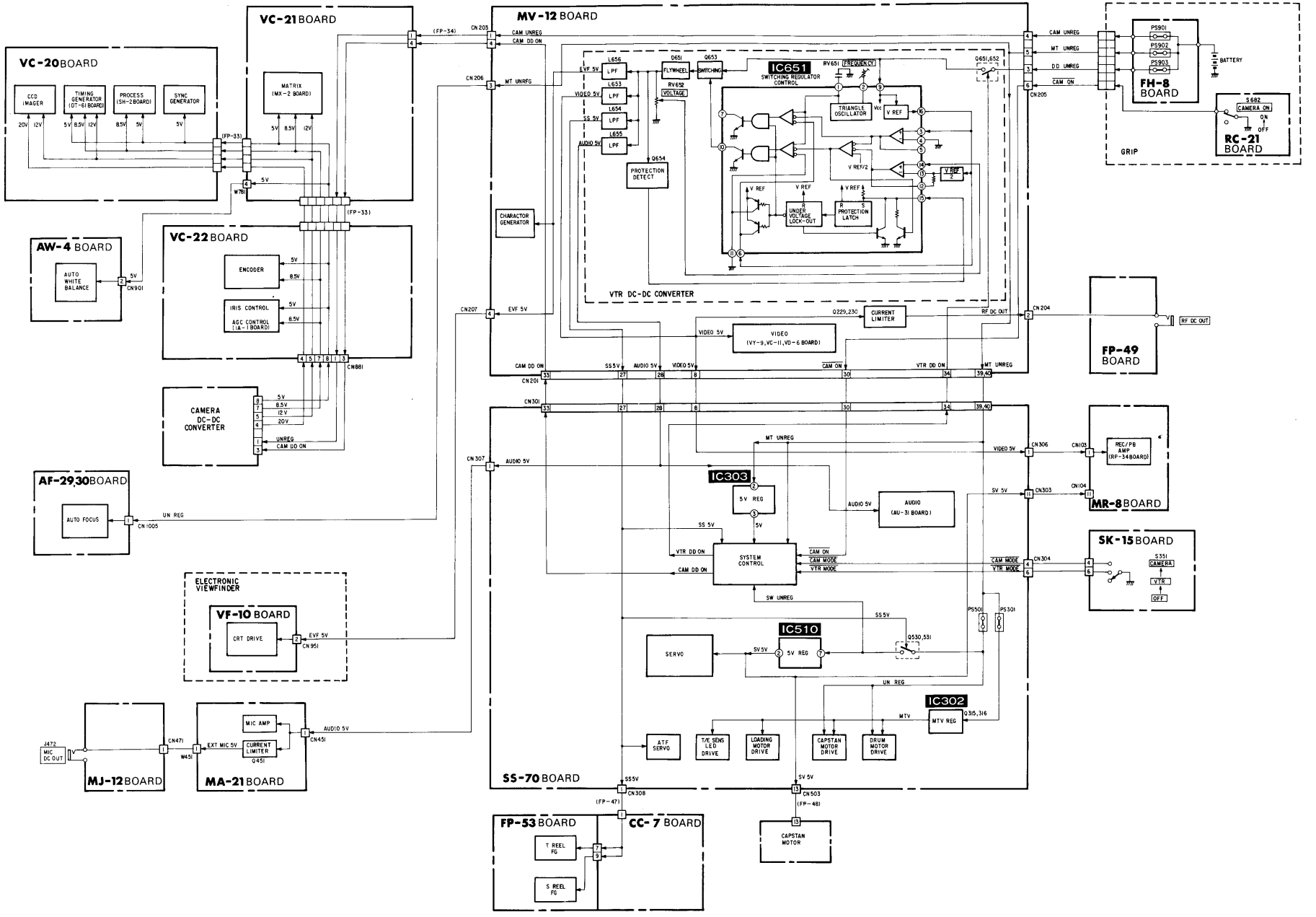
	LOAD	UNLOAD	BRAKE
LOAD	H	L	H
UNLOAD	L	H	H

3-10. AUDIO BLOCK DIAGRAM

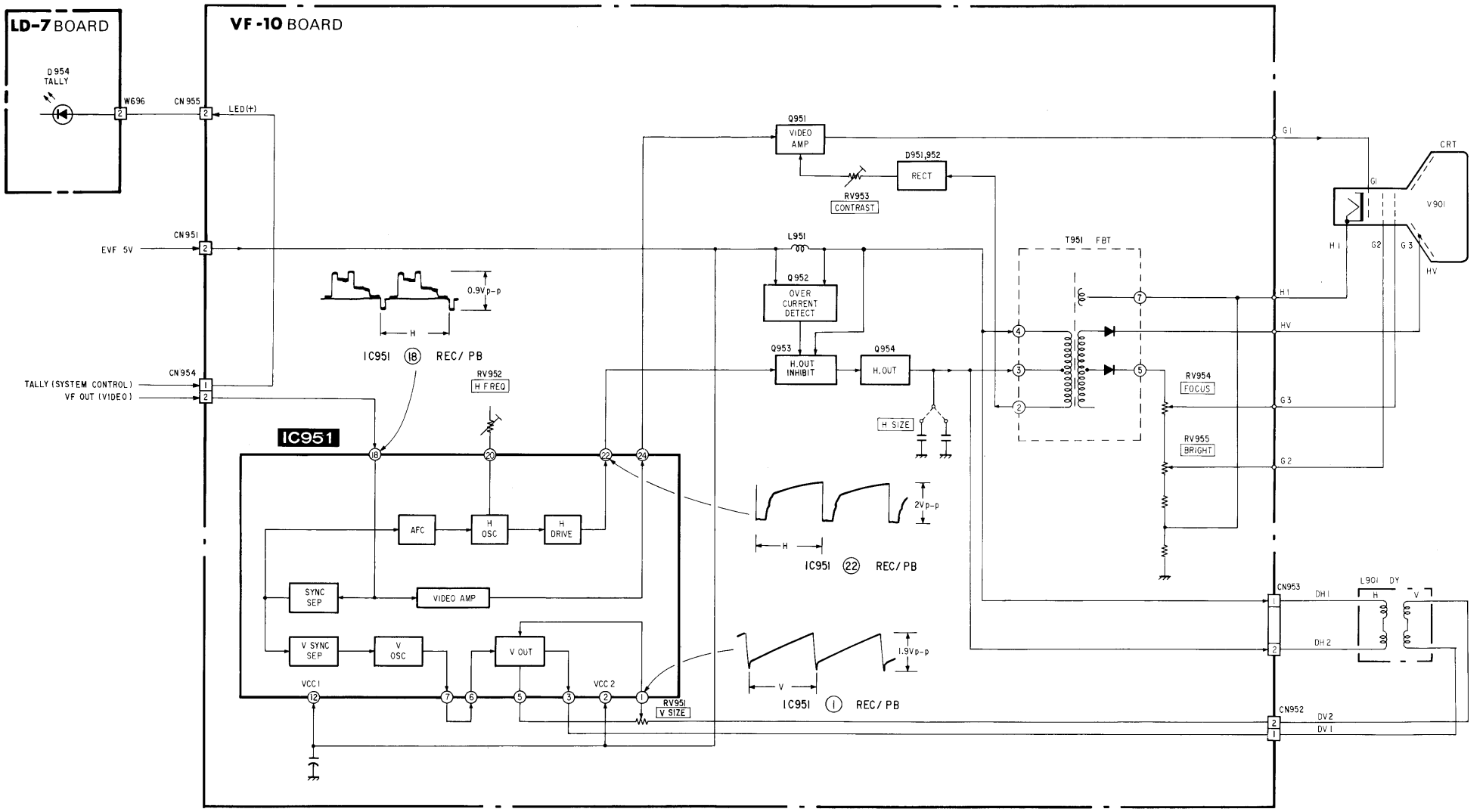



ARD
MA-21 BOARD
AUDIO 5V
Q451
CURRENT LIMITER
IC451 (1/2)
MIC 3V
IC451 (1/2)
MIC AMP
AUDIO 5V
CN307
CN451
EXT MIC 5V
MIC 3.3k
MIC 6.8k
W451
CN471
MJ-12 BOARD
J472
DC OUT
J471
MIC
MIC UNIT
AUDIO 5V
MIC IN
39
IC401
FM MOD/ DEMOD NOISE REDUCTION
RV401 CARRIER
RV402 DEVIATION
Q403
RF AMP
PB AMP
LIMITER
DROP OUT DETECTOR
COMP (FM DEMOD)
HOLD 1
MUTE
V/I CONV
VCO (FM MOD)
LPF
HOLD 2
MUTE DET
PG DOUBLER
LPF
MIC
REC/PB AUDIO
MOA
LIMITER
REC
PB
AGC AMP
AGC DET
WEIGHTING FILTER
DET
EMPH-ASIS-2
VCA
EMPH-ASIS-1
MUTE
BUFFER
5dB AMP
PB
REC
DO
Q406
AUDIO MUTE
Q404,405
LINE AMP
33
CN301
MV-12 BOARD
CN201
CN204
FP-49 BOARD
AUDIO OUT
31
A MUTE
28
VA.PB MODE
SYSTEM CONTROL (SS-70 BOARD)
27
RF SWP (SERVO)

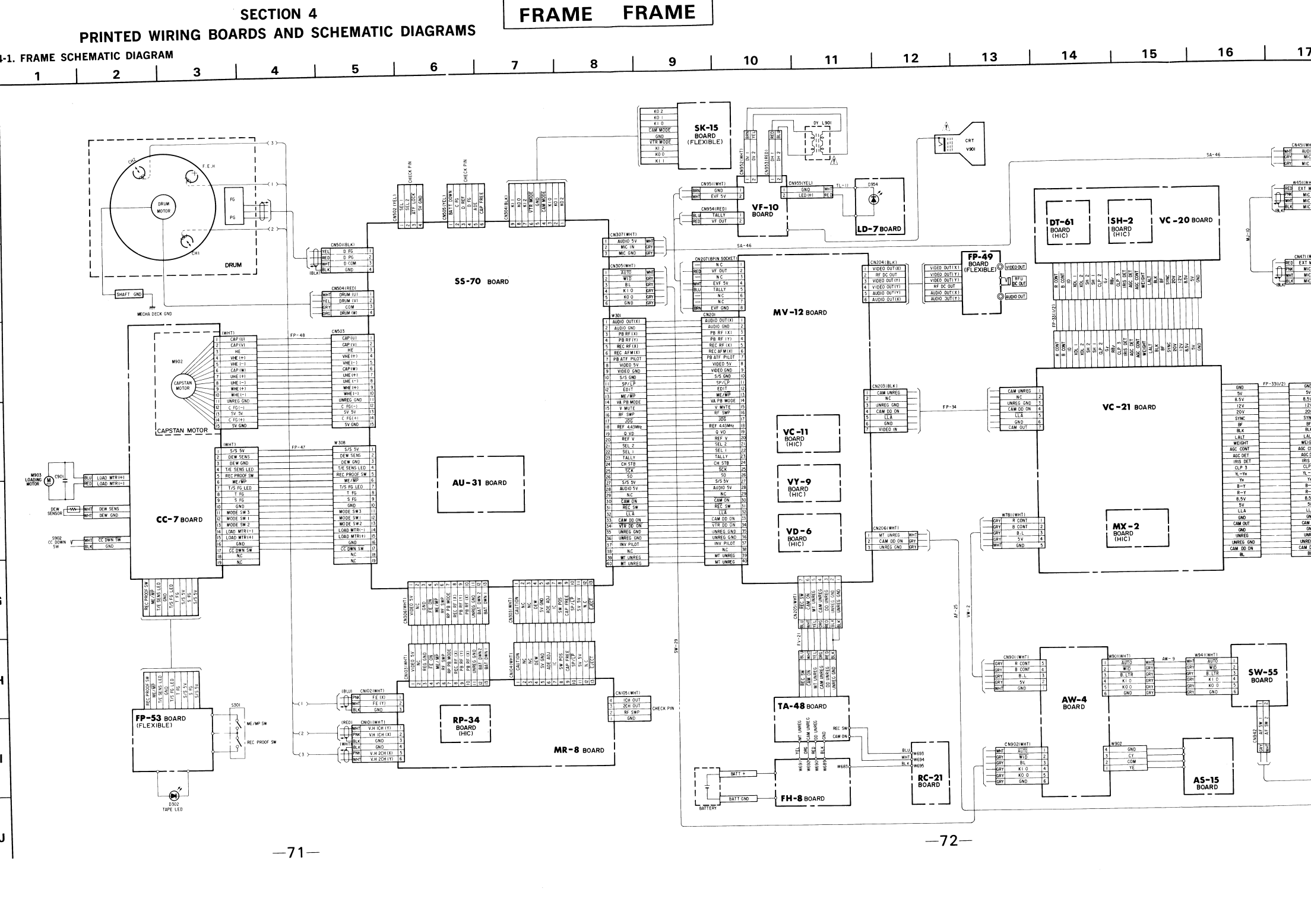
3-11. POWER BLOCK DIAGRAM

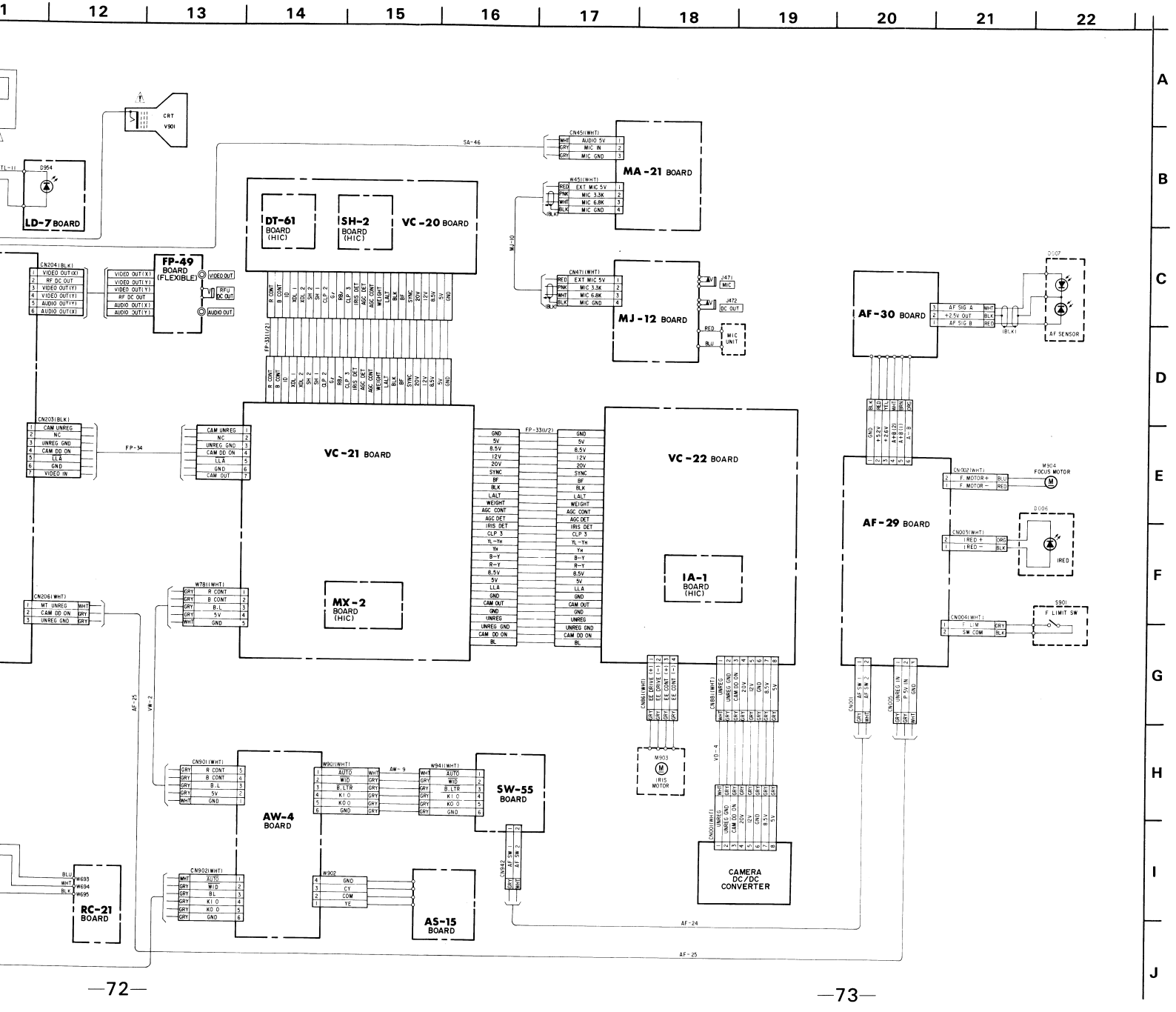


3-12. VIEWFINDER BLOCK DIAGRAM



4-1. FRAME SCHEMATIC DIAGRAM



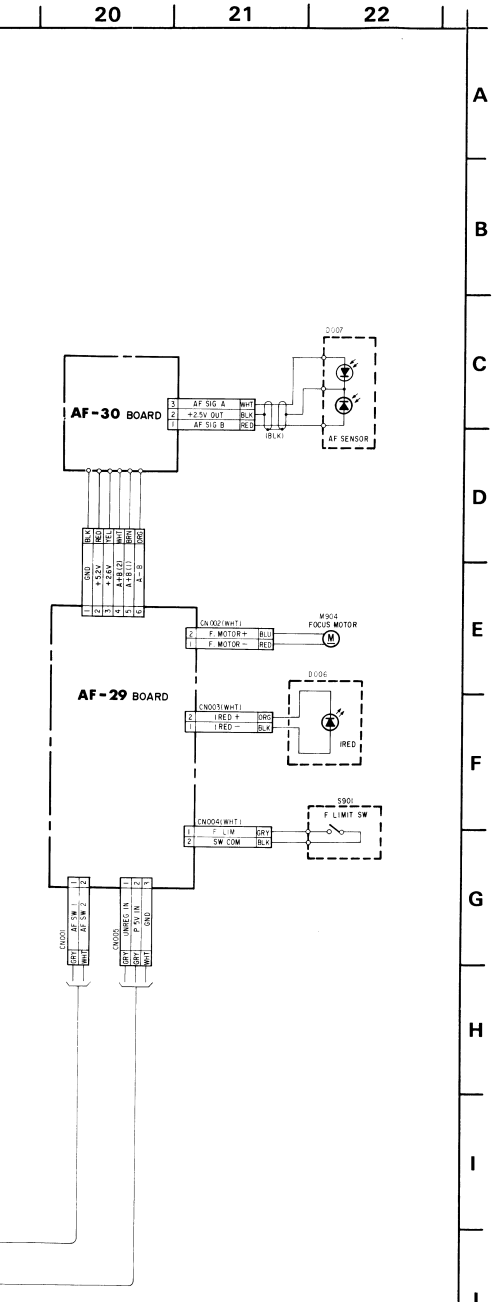


Precantions for replacement of CCD imager

- With a pair of IC701 (CCD imager) on the VC-20 cor
  it is used a repair part of the CCD imager block.
  Since corrector ROM IC is manufactured to match t
  corrector ROM cannot be allowed.
- When both a CCD imager and the corrector ROM, re
  ROM is not mounted on the service set, install a corre
- IC701 (CCD imager) is not mounted on the VC-20 co
  ROM) is not mounted on the DT-61 complete boar
  replaced, remove the respective ICs from the old bo
- After the CCD imager block has been replaced, per
- CCD imager is structurally in case of being broken d
  well as MOS IC. Moreover, care should be taken fo
  light not to get into there.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.



Precantions for replacement of CCD imager block.

- With a pair of IC701 (CCD imager) on the VC-20 complete board and IC002 (corrector ROM) on the DT-61 complete board, it is used a repair part of the CCD imager block.
  Since corrector ROM IC is manufactured to match the CCD imager, replacement of a single unit of the CCD imager corrector ROM cannot be allowed.
- When both a CCD imager and the corrector ROM, replace both the CCD imager and the corrector ROM, when a corrector ROM is not mounted on the service set, install a corrector ROM which is supplied anew.
- IC701 (CCD imager) is not mounted on the VC-20 complete board to be supplied as a repair part, and IC002 (corrector ROM) is not mounted on the DT-61 complete board to be supplied as a repair part. When the respective boards are replaced, remove the respective ICs from the old boards and install them to the new ones respectively.
- After the CCD imager block has been replaced, perform the entire adjustments of the camera section.
- CCD imager is structurally in case of being broken down by static electricity. For this reason, take care to handle it as well as MOS IC. Moreover, care should be taken for dust not to be stuck on the light reseiving section and for strong light not to get into there.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

Note:

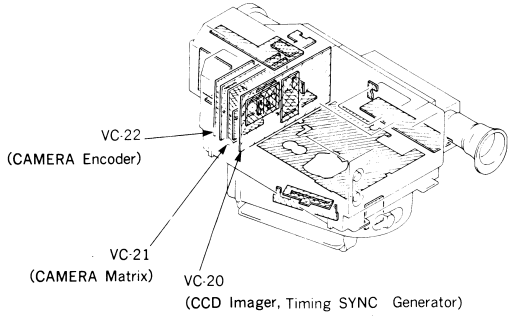
- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.
- : B+ pattern from the side which enables seeing.
- Digital transistor(VC-22:Q861)transistor with resistor. Refer to the VC-22 board schematic diagram for digital transistor.

Caution:

Pattern face side: (Solder Side) Parts on the pattern face side seen from the pattern face are indicated.

Parts face side: (Component Side) Parts on the parts face side seen from the parts face are indicated.

When indicating parts by reference number, please include the board name.

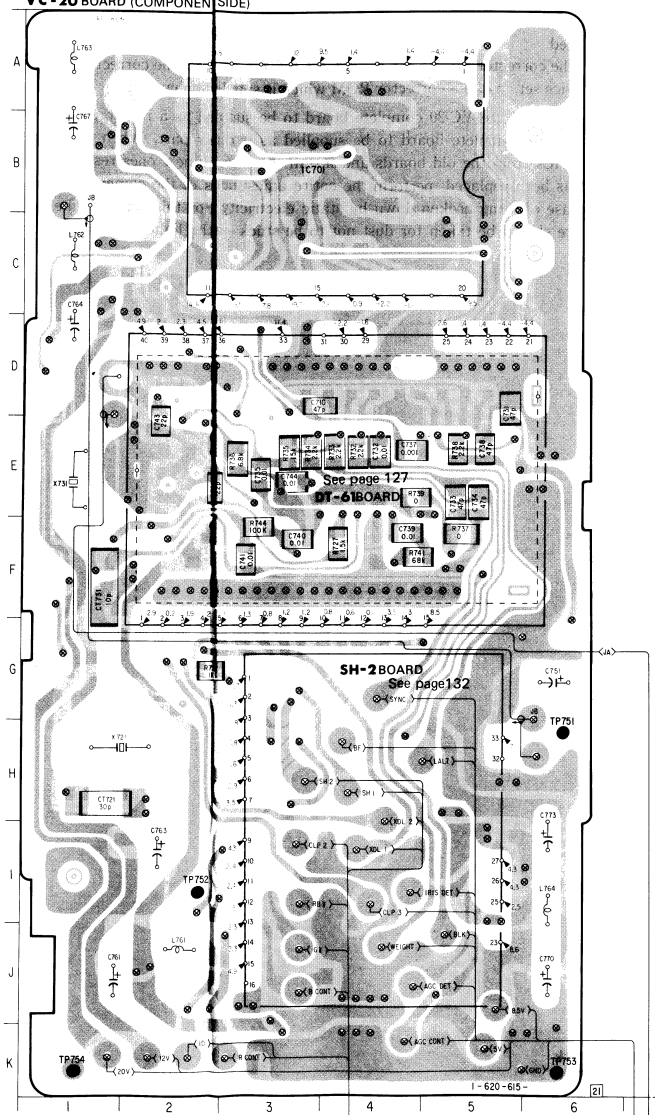


VC-20 (CCD IMAGER, TIMING/SYNC GENERATOR), VC-21 (CAMERA MATRIX), VC-22 (CAMERA ENCODER) PRINTED WIRING BOARDS

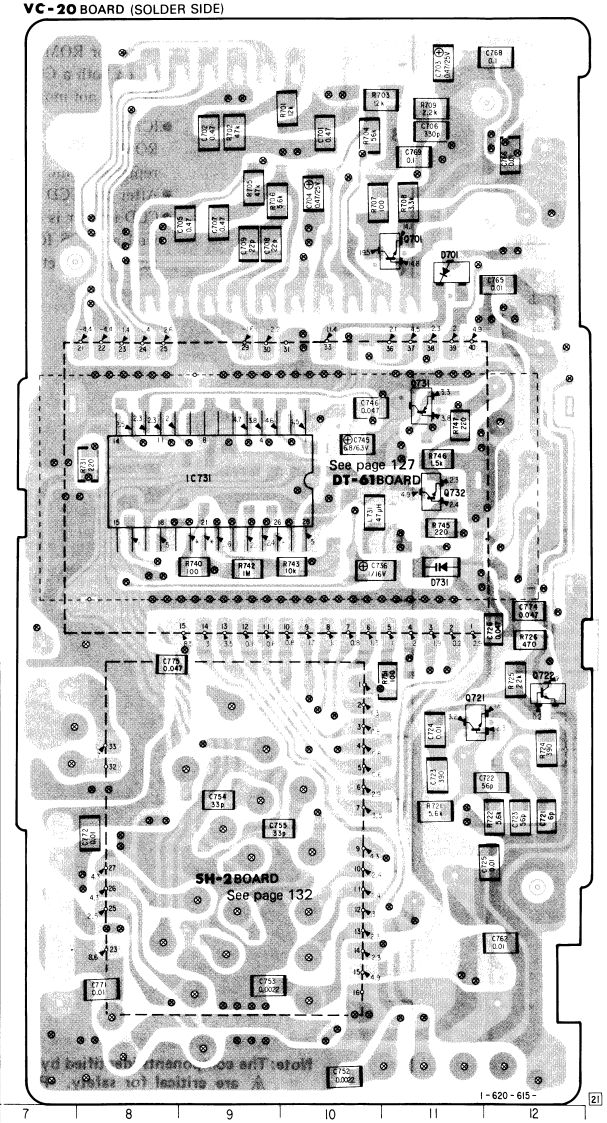
—Ref. No. VC-20 BOARD, VC-21 BOARD, VC-22 BOARD : 1, 000 series—

CT721	H-1
CT731	F-1
D701	C-11
D731	F-11
IC701	B-4
IC731	E-9
Q701	C-11
Q721	G-11
Q722	G-12
Q731	D-11
Q732	E-11
TP751	H-6
TP752	I-2
TP753	K-6
TP754	K-1

VC-20 BOARD (COMPONENT SIDE)



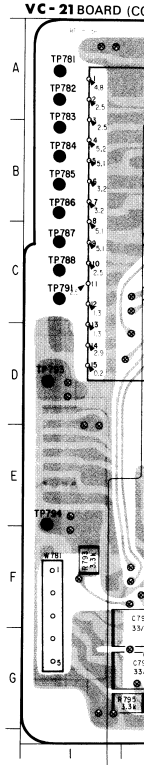
VC-20 BOARD (SOLDER SIDE)



Be sure to always read "N
replacing the VC-20 cor
block (IC701 on the VC-2

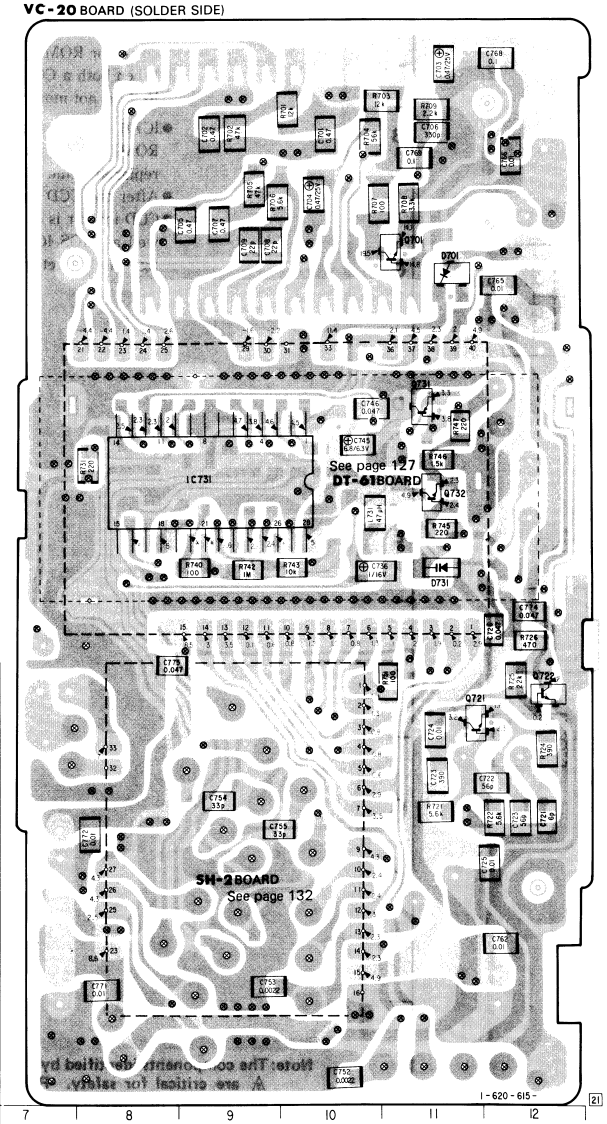
VC-21 BOARD	
IC781	F-3
RV781	E-3
RV782	E-2
TP781	A-1
TP782	A-1
TP783	B-1
TP784	B-1
TP785	B-1
TP786	B-1
TP787	C-1
TP788	C-1
TP789	B-5
TP790	B-5
TP791	C-1
TP792	A-6
TP793	D-1
TP794	E-1

VC-21 BOARD (CO



Be sure to always read "Note on replacing the CCD imager block" in page 74 when replacing the VC-20 complete board, DT-61 complete board, and CCD imager block (IC701 on the VC-20 board and IC002 on the DT-61 board).

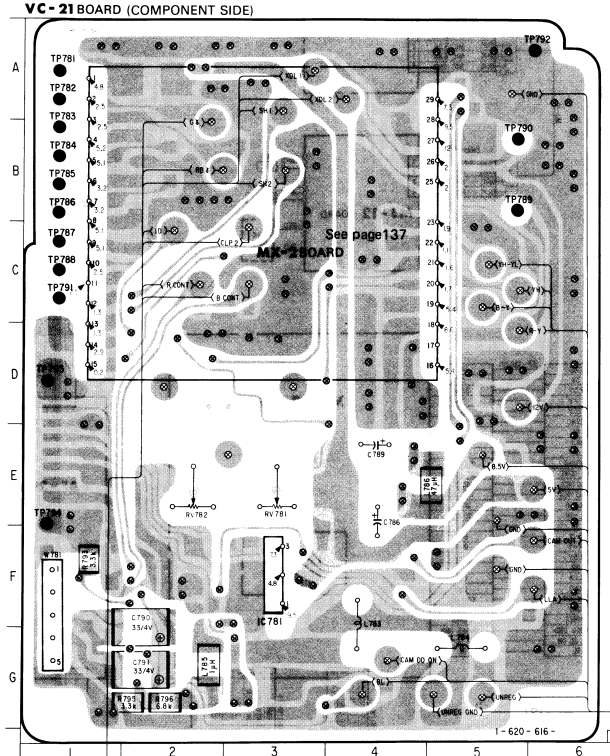
VC-20 BOARD (SOLDER SIDE)



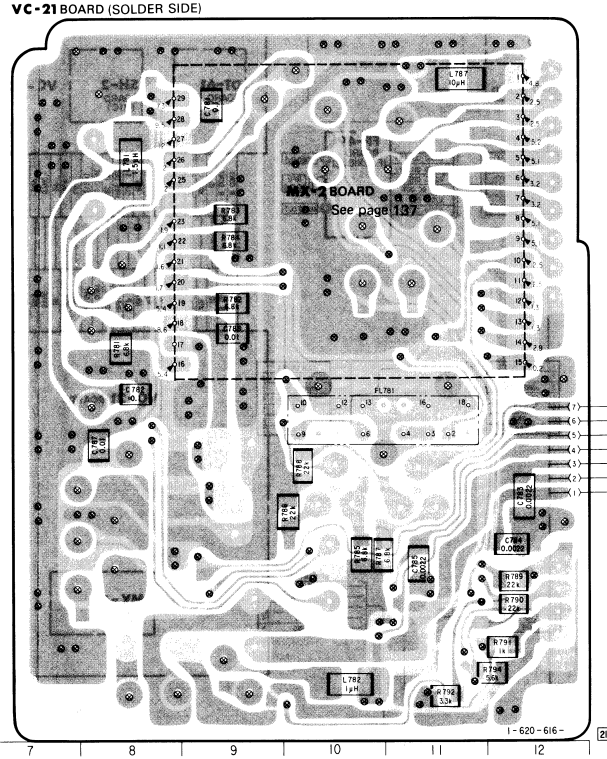
VC-21 BOARD

IC781	F-3
RV781	E-3
RV782	E-2
TP781	A-1
TP782	A-1
TP783	B-1
TP784	B-1
TP785	B-1
TP786	B-1
TP787	C-1
TP788	C-1
TP789	B-5
TP790	B-5
TP791	C-1
TP792	A-6
TP793	D-1
TP794	E-1

VC-21 BOARD (COMPONENT SIDE)



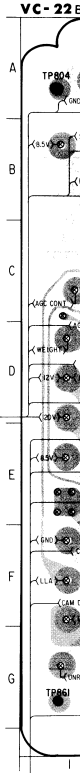
VC-21 BOARD (SOLDER SIDE)



VC-22 BOARD

D801	B-11
D802	B-8
D861	E-11
IC801	B-5
Q801	E-5
Q802	E-5
Q803	E-5
Q804	F-4
Q805	F-5
Q806	E-9
Q807	E-5
Q808	E-8
Q809	F-9
Q861	G-6
Q862	F-2
RV801	D-3
RV802	C-3
RV803	C-4
RV804	D-4
RV805	C-5
RV806	C-3
RV807	D-5
RV808	C-5
RV809	D-3
RV810	D-5
TP801	D-6
TP802	A-4
TP803	D-4
TP804	A-1
TP861	G-1

VC-22 B

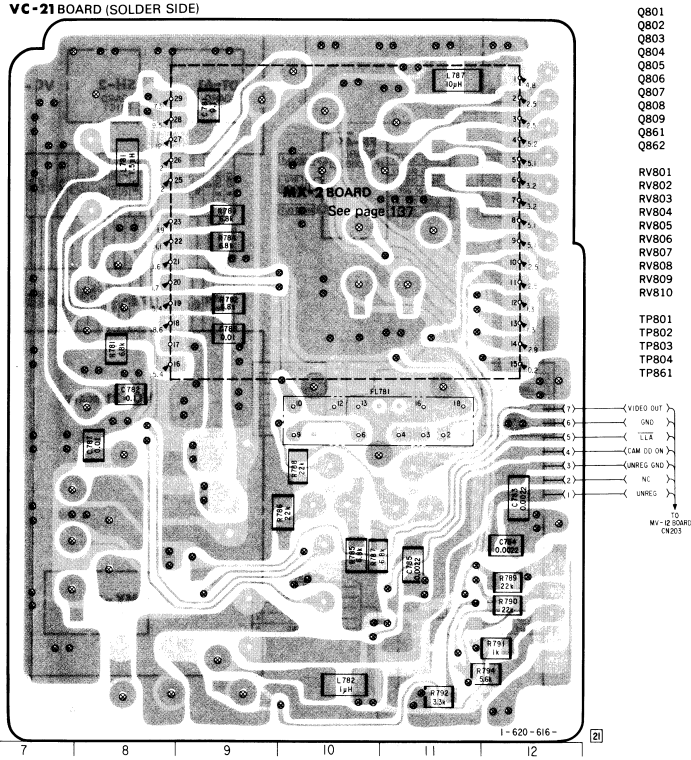


in page 74 when
and CCD imager
rd).

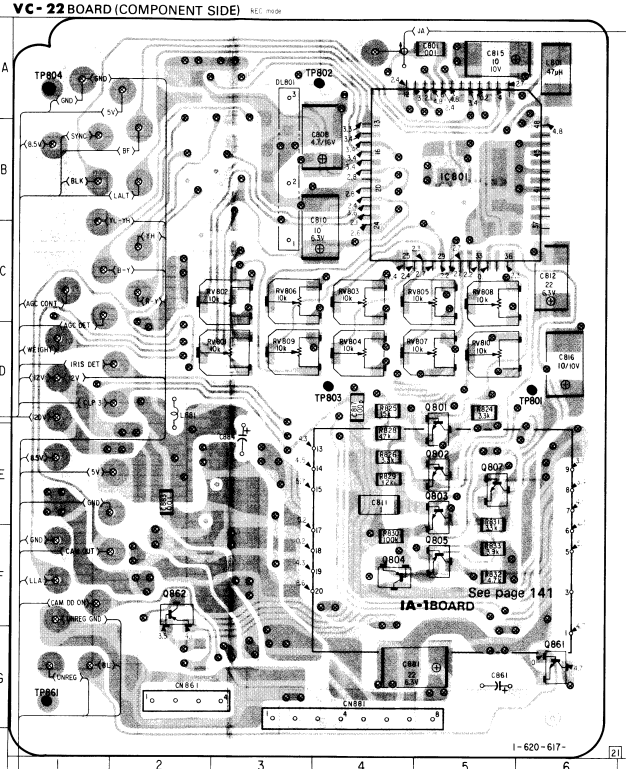
VC-22 BOARD

D801	B-11
D802	B-8
D861	E-11
IC801	B-5
Q801	E-5
Q802	E-5
Q803	E-5
Q804	F-4
Q805	F-5
Q806	E-9
Q807	E-5
Q808	E-8
Q809	F-9
Q861	G-6
Q862	F-2
RV801	D-3
RV802	C-3
RV803	C-4
RV804	D-4
RV805	C-5
RV806	C-3
RV807	D-5
RV808	C-5
RV809	D-3
RV810	D-5
TP801	D-6
TP802	A-4
TP803	D-4
TP804	A-1
TP861	G-1

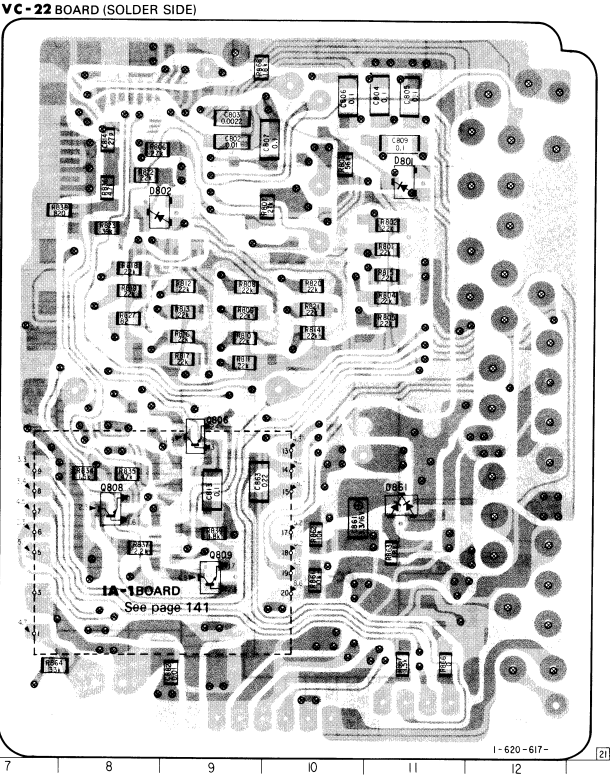
VC-21 BOARD (SOLDER SIDE)

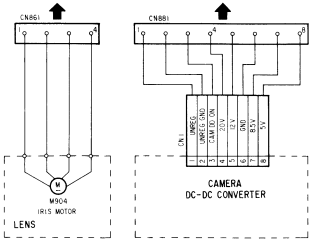


VC-22 BOARD (COMPONENT SIDE) REC mode



VC-22 BOARD (SOLDER SIDE)



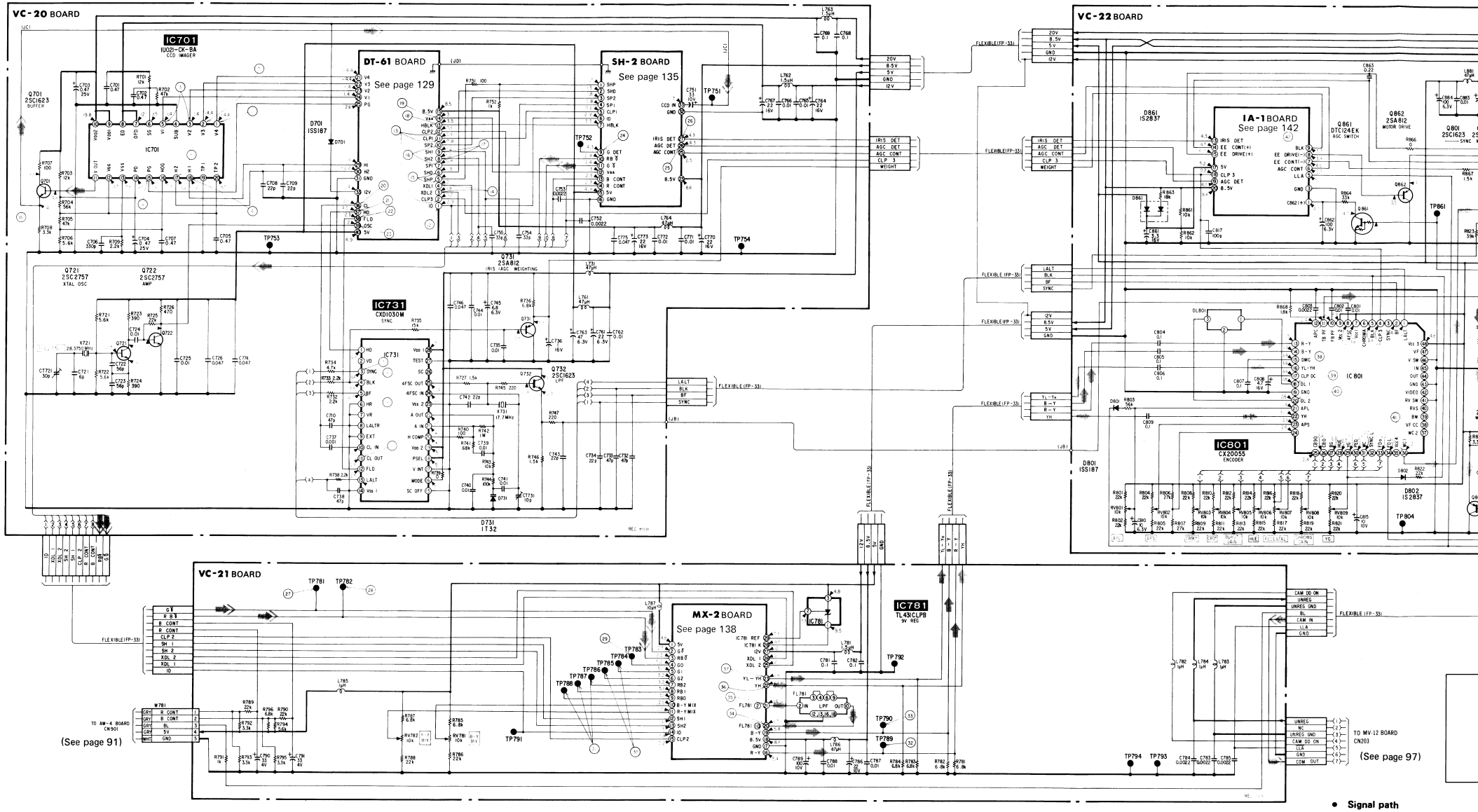


When indicating parts by reference number, please include the board name.

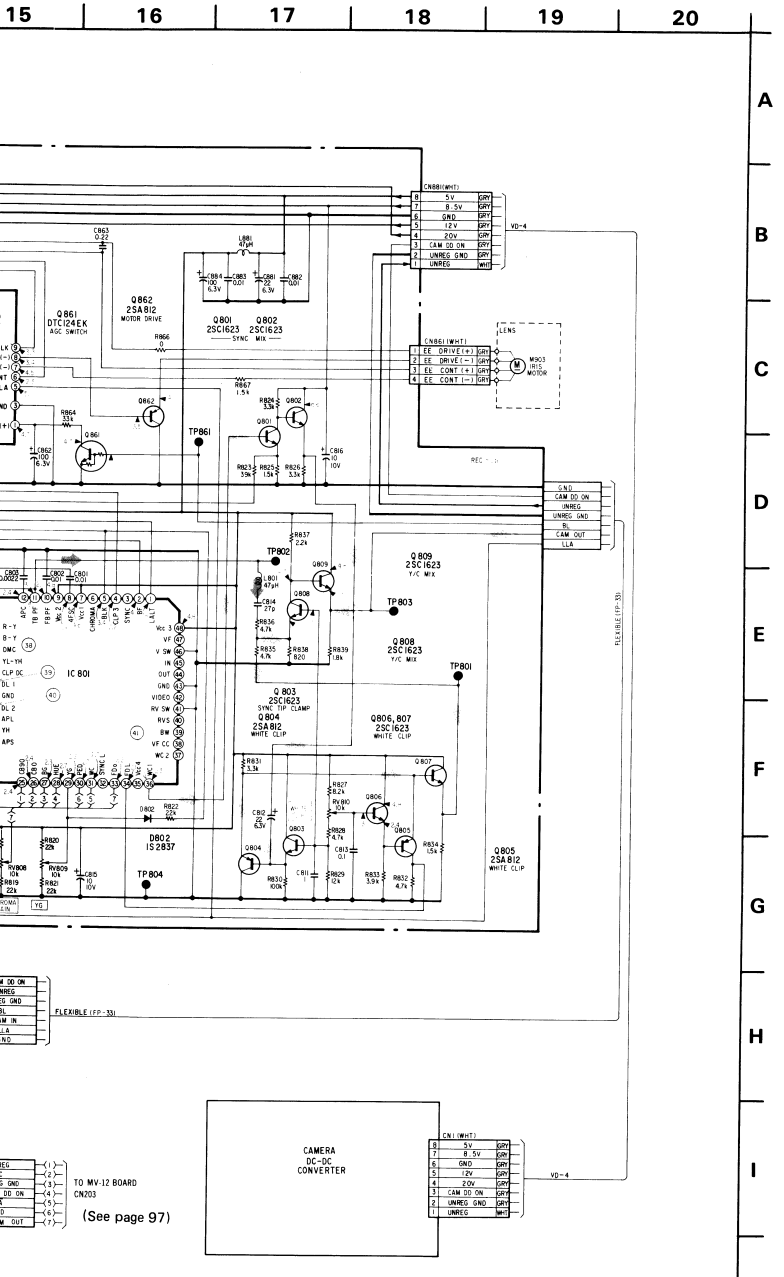
VC-20 (CCD IMAGER, TIMING/SYNC GENERATOR), VC-21 (CAMERA MATRIX), VC-22 (CAMERA ENCODER) SCHEMATIC DIAGRAMS

—Ref. No. VC-20 BOARD, VC-21 BOARD, VC-22 BOARD : 1, 000 series—

Be sure to always read "Note on replacing the CCD imager block" in page 74 when replacing the VC-20 complete board, DT-61 complete board, and CCD imager block (IC701 on the VC-20 board and IC002 on the DT-61 board).



- **Signal path**
  - : REC Y Signal
  - : REC CHROMA Sig
  - : REC Y/CHROMA

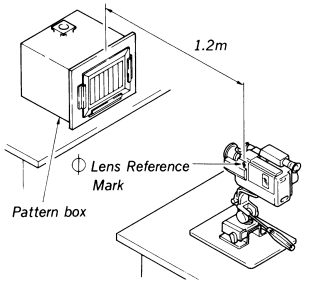


- **Signal path**
  - : REC Y Signal
  - : REC CHROMA Signal
  - : REC Y/CHROMA Signal

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- : panel designation.
- : Nonflammable resistor
- : B+ bus.
- : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

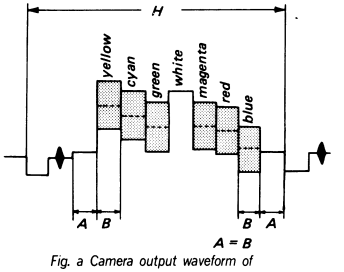


Fig. a Camera output waveform of TP803 on VC-22 board

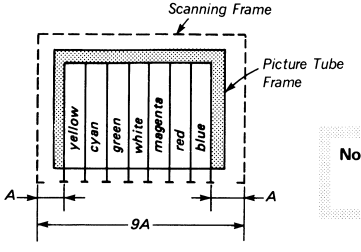
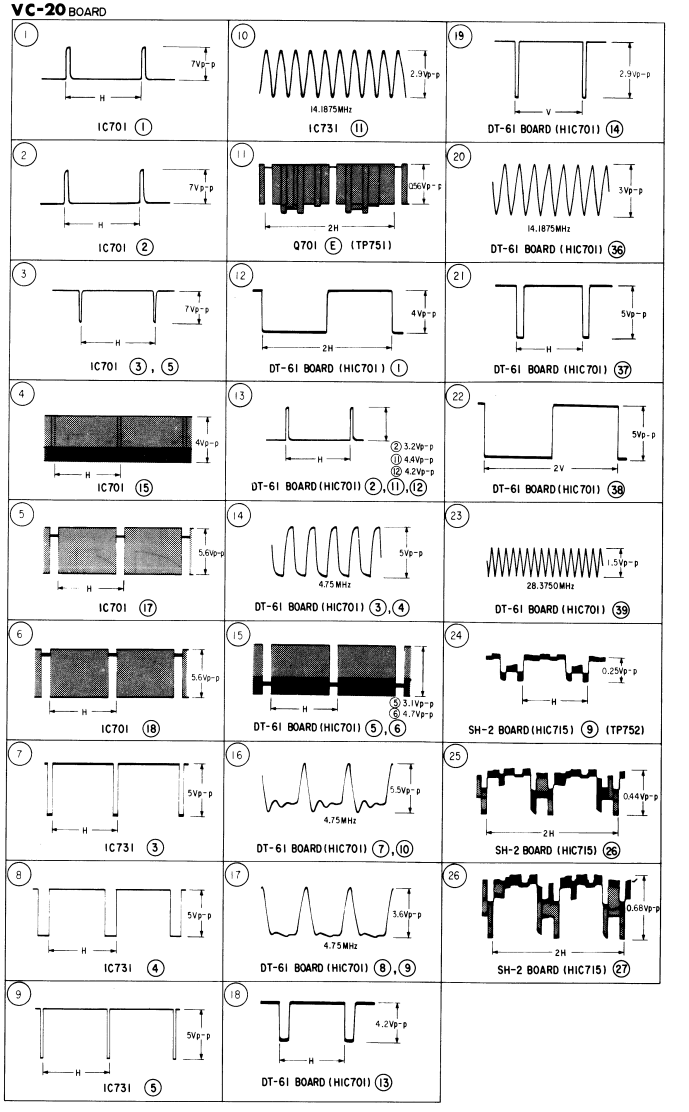


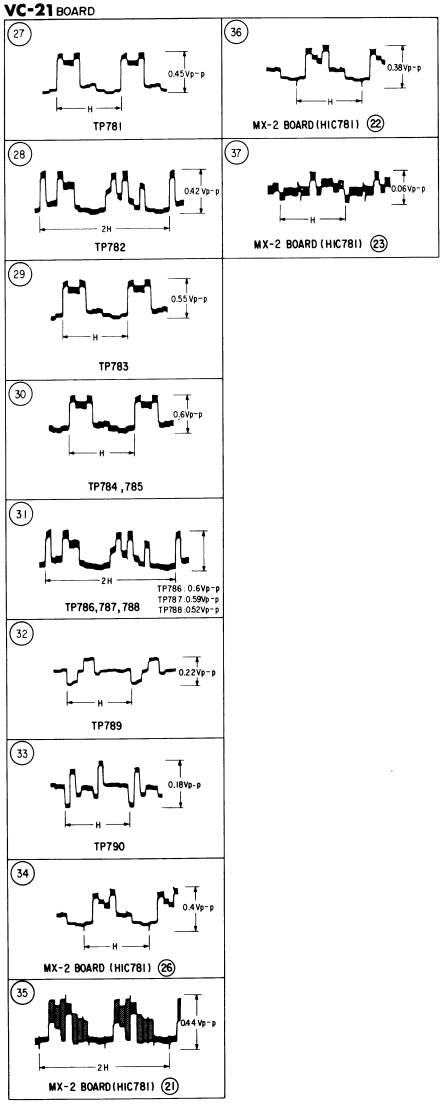
Fig. b Picture of TV monitor screen

VC-20 BOARD

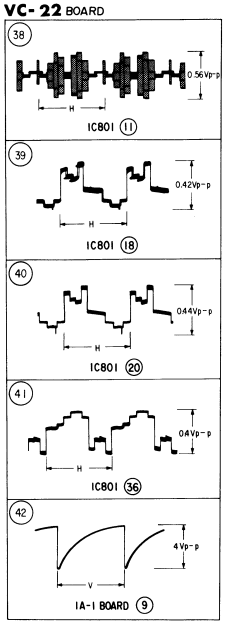


Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

VC-21 BOARD



VC- 22 BOARD



Note:

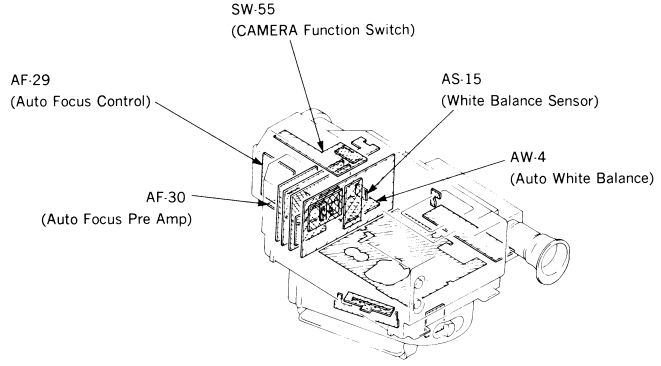
- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▒ : Pattern from the side which enables seeing.
- ▒ : Pattern of the rear side.
- ▒ : B+ pattern from the side which enables seeing.
- Digital transistor(AW-4:Q901,Q902,Q903,Q904,Q905,Q906, Q907,Q908,Q909,Q910,Q911,Q912)transistor with resistor. Refer to the AW-4 board schematic diagram for digital transistor.

Caution:

Pattern face side: (Solder Side) Parts on the pattern face side seen from the pattern face are indicated.

Parts face side: (Component Side) Parts on the parts face side seen from the parts face are indicated.

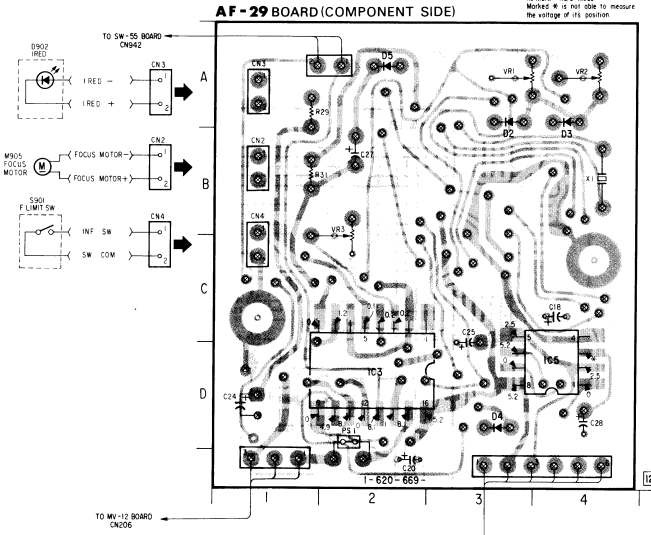
When indicating parts by reference number, please include the board name.

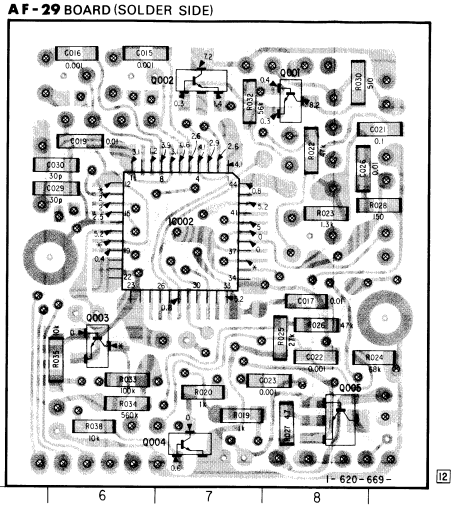


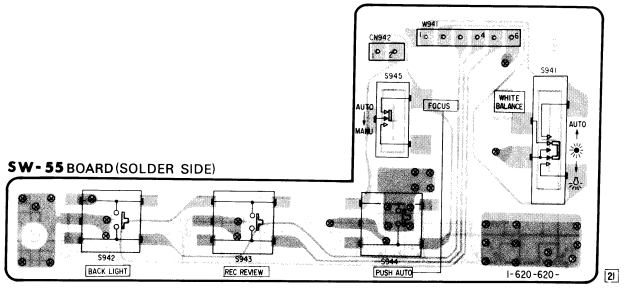
AF-29 (AUTO FOCUS CONTROL), AF-30 (AUTO FOCUS PRE AMP), AW-4 (AUTO WHITE BALANCE), SW-55 (CAMERA FUNCTION SWITCH), AS-15 (WHITE BALANCE SENSOR) PRINTED WIRING BOARDS

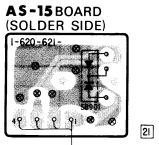
—Ref. No. AF-29 BOARD, AF-30 BOARD, AW-4 BOARD : 2,000 series, SW-55 BOARD : 6,000 series—

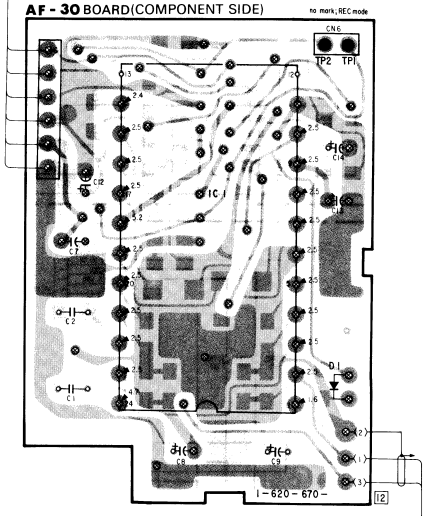
A-3
A-4
D-3
A-2
B-7
D-2
D-4
A-8
A-7
D-6
D-7
D-8
A-3
A-4
B-2

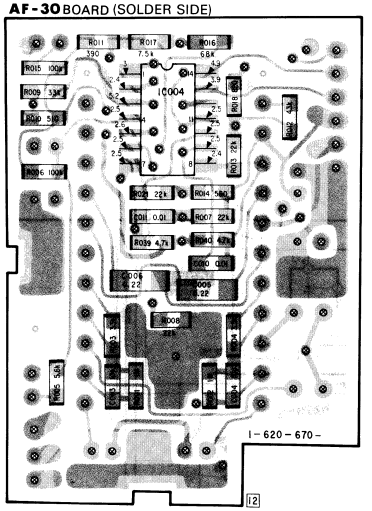










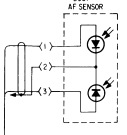


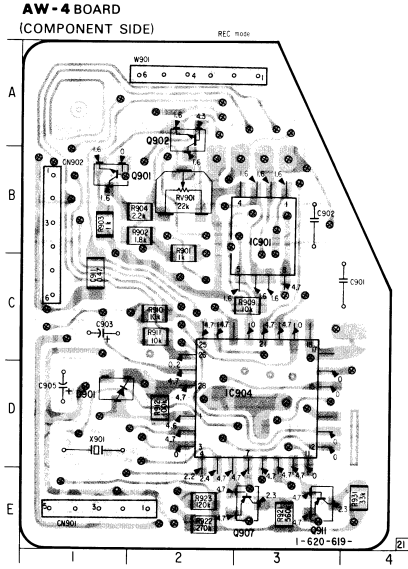
D901 D-1

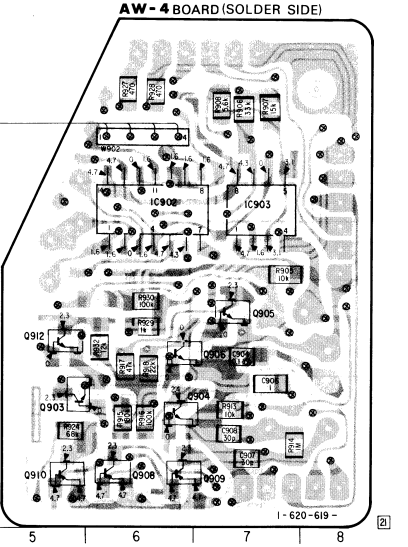
IC901 B-3
IC902 B-6
IC903 B-7
IC904 D-3

Q901 B-1
Q902 A-2
Q903 D-5
Q904 D-6
Q905 C-7
Q906 D-6
Q907 E-3
Q908 E-6
Q909 E-6
Q910 E-5
Q911 E-3
Q912 D-5

RV901 B-2

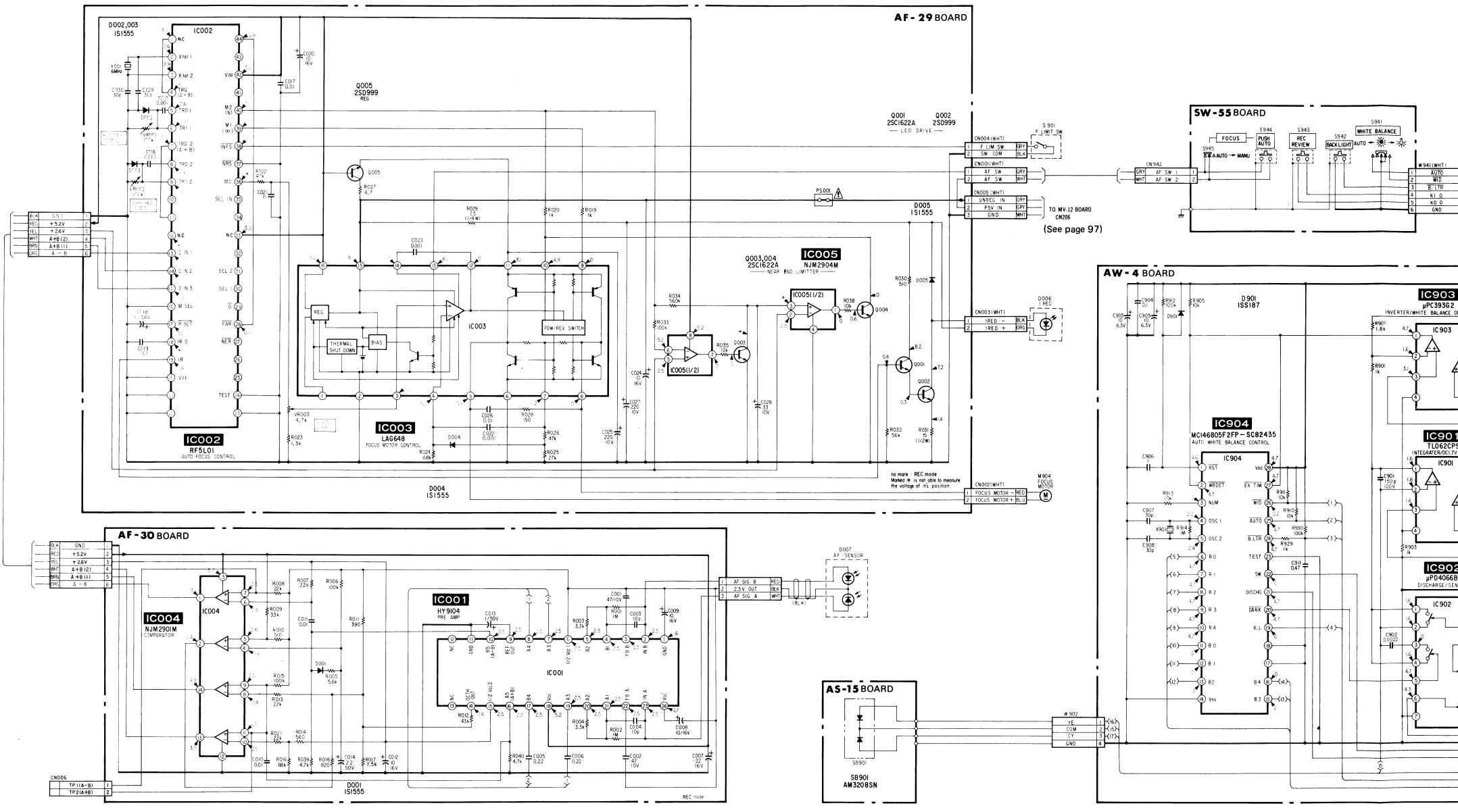


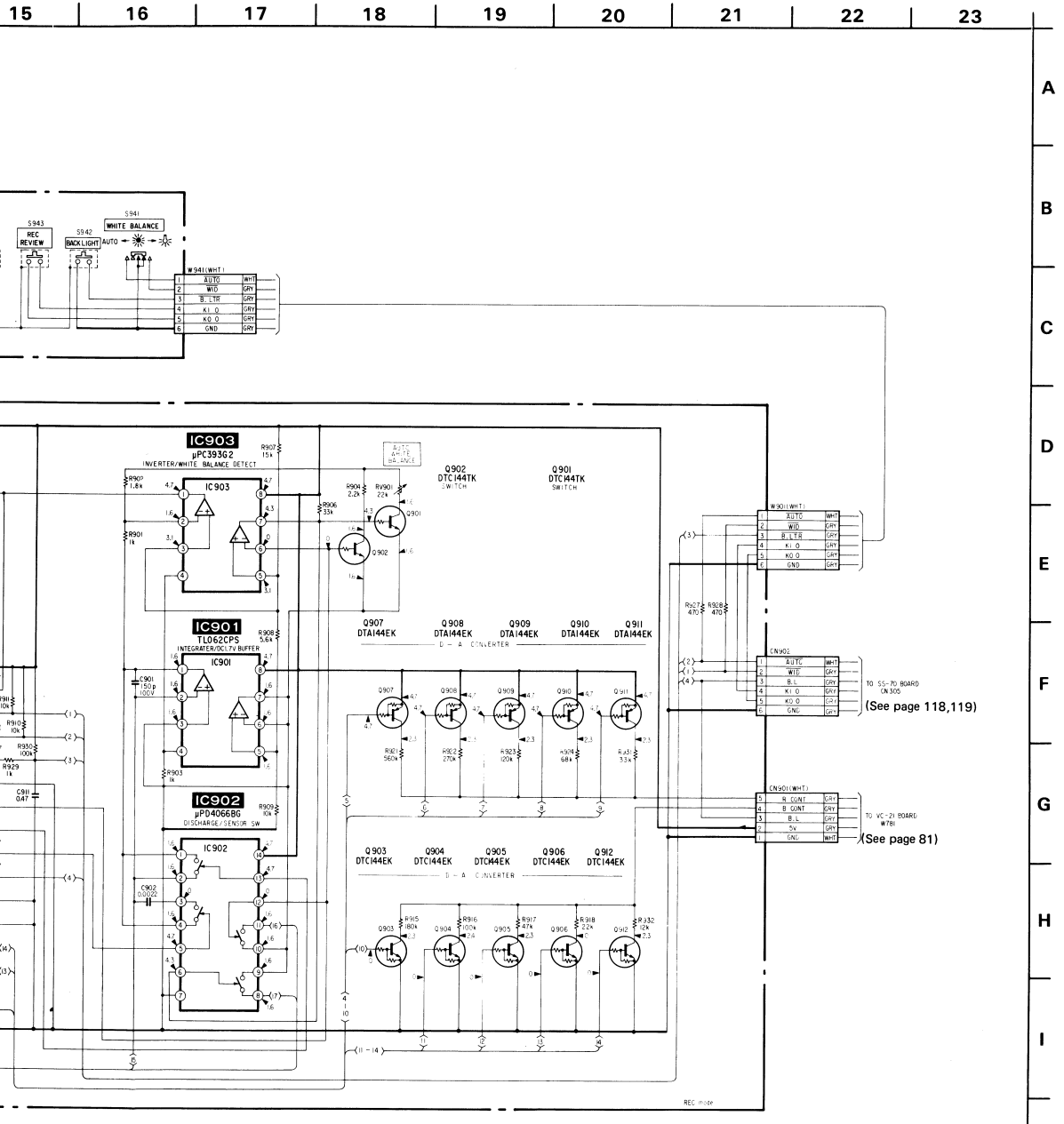




AF-29 (AUTO FOCUS CONTROL), AF-30 (AUTO FOCUS PRE AMP), AW-4 (AUTO WHITE BALANCE), SW-55 (CAMERA FUNCTION SWITCH), AS-15 (WHITE BALANCE SENSOR) SCHEMATIC DIAGRAMS

—Ref. No. AF-29 BOARD, AF-30 BOARD, AW-4 BOARD : 2,000 series, SW-55 BOARD : 6,000 series—





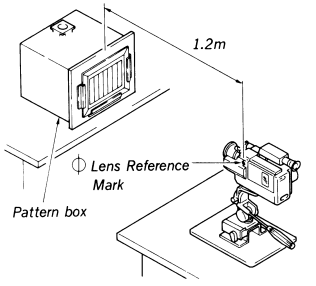
Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ⏦ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

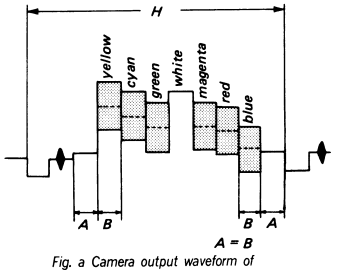


Fig. a Camera output waveform of TP803 on VC-22 board

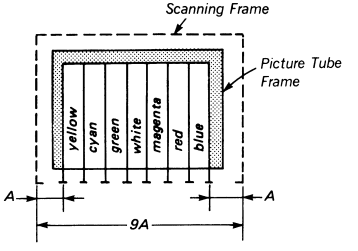


Fig. b Picture of TV monitor screen

MV-12 (VIDEO SIGNAL PROCESS), MR-8 (REC/PB AMP), TA-48 (RELAY BOARD), RC-21 (START/STOP/CAMERA ON SWITCH), FH-8 (POWER) PRINTED WIRING BOARDS

—Ref. No. MV-12 BOARD, MR-8 BOARD : 3,000 series, RC-21 BOARD, FH-8 BOARD, TA-48 BOARD : 8,000 series—

CV201 D-3

D201 J-11
D202 L-13
D203 M-14
D204 M-13
D205 M-13
D206 L-13
D207 K-7
D208 D-2
D209 D-2
D651 A-7

IC204 E-3
IC651 B-6

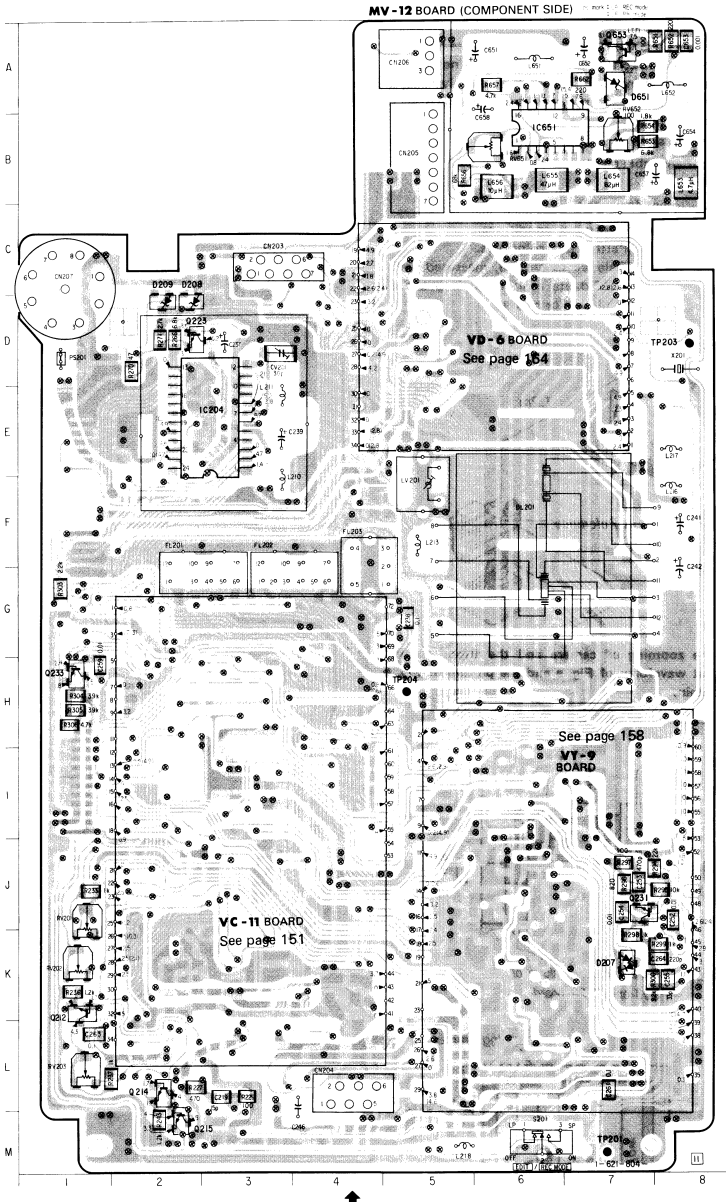
LV201 F-5

Q201 L-11
Q202 K-11
Q203 J-11
Q204 I-11
Q205 J-12
Q206 J-11
Q207 H-11
Q208 H-11
Q209 L-15
Q210 L-15
Q211 J-15
Q212 K-1
Q213 L-16
Q214 L-2
Q215 M-2
Q216 K-14
Q217 K-15
Q218 H-14
Q219 H-15
Q220 I-15
Q221 I-15
Q222 E-15
Q223 D-2
Q224 F-13
Q227 I-11
Q228 M-11
Q229 L-13
Q230 L-14
Q231 J-7
Q232 I-12
Q233 H-1
Q652 A-10
Q653 A-7
Q654 B-12

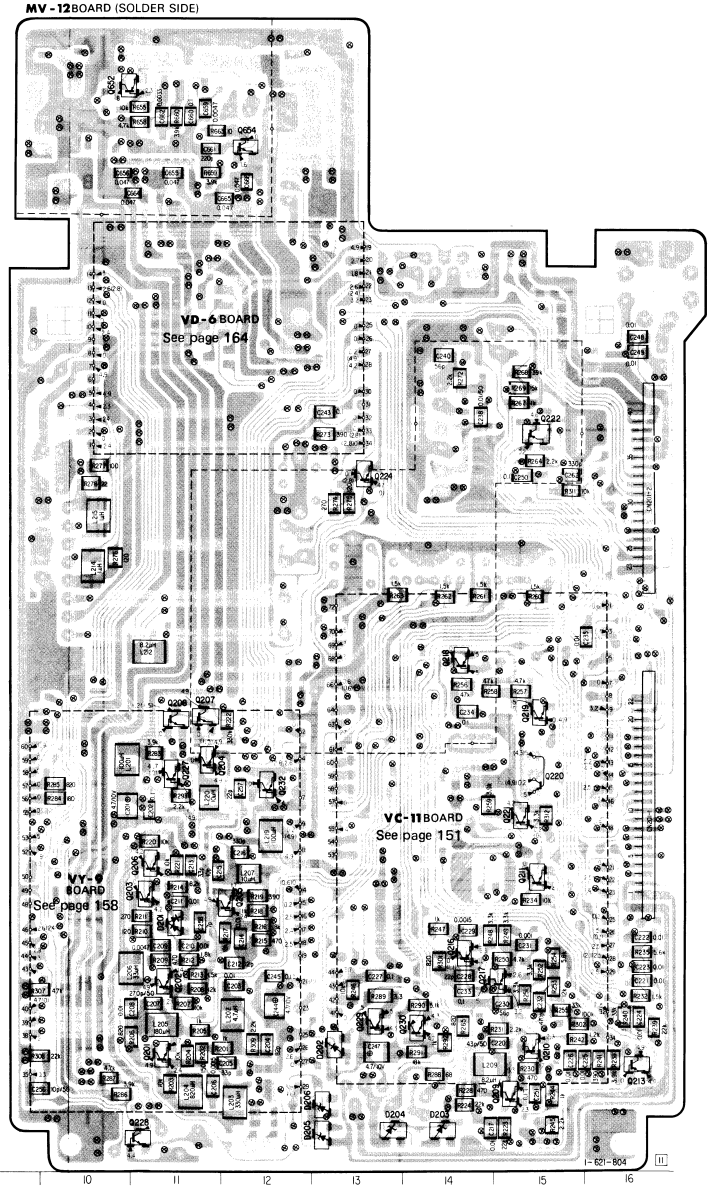
RV201 J-1
RV202 K-1
RV203 L-1
RV651 B-6
RV652 B-7

TP201 M-7
TP203 D-9
TP204 H-5

MV-12 BOARD (COMPONENT SIDE)



MV-12 BOARD (SOLDER SIDE)



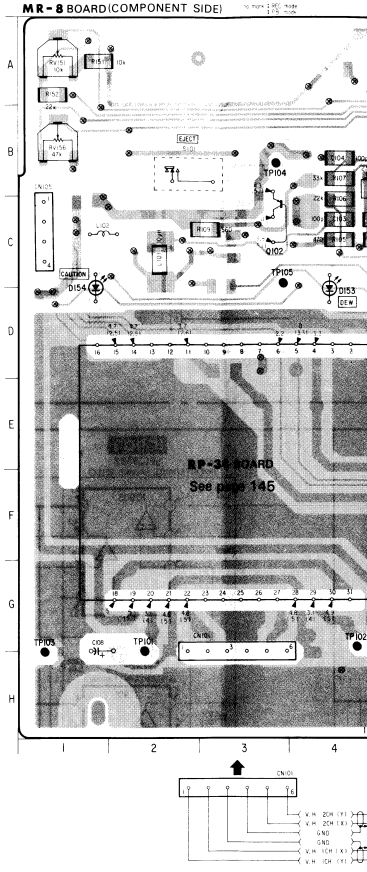
D153 D-4
D154 D-1

Q102 C-3
Q103 B-5
Q151 A-7

RV151 A-1
RV152 A-5
RV153 A-5
RV155 A-5
RV156 B-1

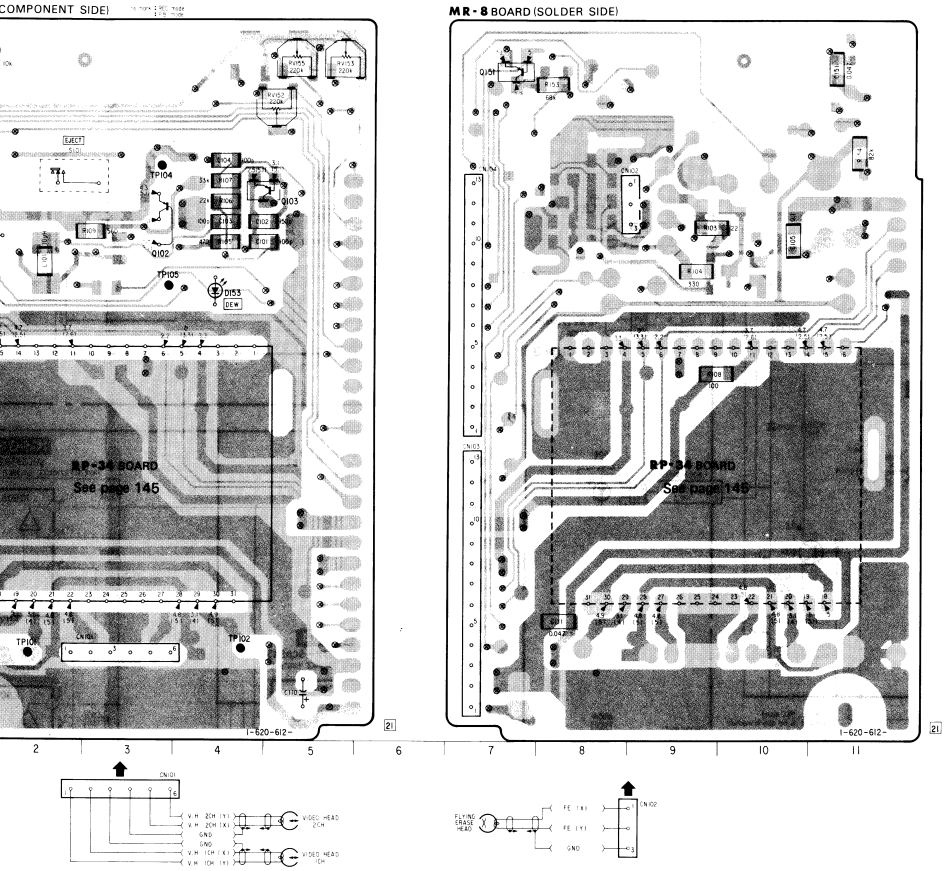
TP101 H-2
TP102 G-4
TP103 H-1
TP104 B-3
TP105 C-3

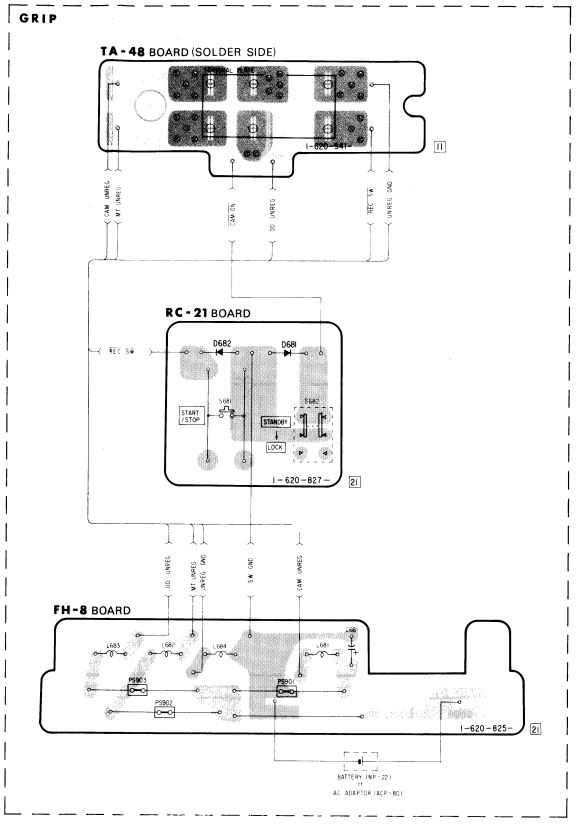
MR-8 BOARD (COMPONENT SIDE)



Note:

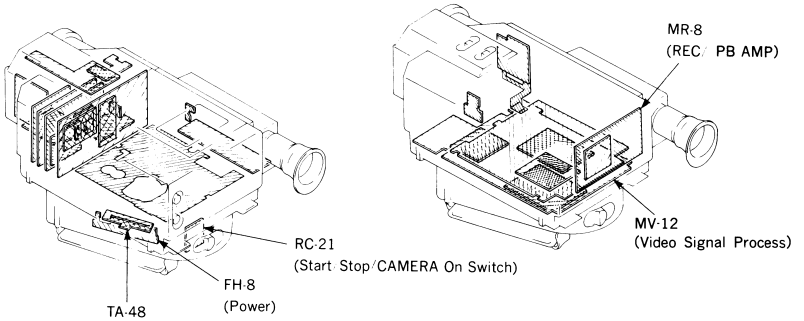
- ○— : indicates a lead wire mounted on the co
- ●— : indicates a lead wire mounted on the pri
- ⊗ : Through hole.
- : Pattern from the side which enables seei
- : B+ pattern from the side which enables s
- Digital transistor(MV-12:Q203,Q204,Q206,Q2 Q218,Q219,Q221,Q222,Q224,Q227,Q228,Q6 sistor with resistor.
  Refer to the MV-12 board schematic diagram f sistor.
- Disital transistor(MR-8:Q151)transistor with re
  Refer to the MR-8 board schematic diagram fo sistor.





dicates a lead wire mounted on the component side.
dicates a lead wire mounted on the printed side.
rough hole.
ttern from the side which enables seeing.
pattern from the side which enables seeing.
ansistor(MV-12:Q203,Q204,Q206,Q208,Q211,Q213,
19,Q221,Q222,Q224,Q227,Q228,Q652,Q654)tran-
h resistor.
the MV-12 board schematic diagram for digital tran-

nsistor(MR-8:Q151)transistor with resistor.
he MR-8 board schematic diagram for digital tran-



Caution:

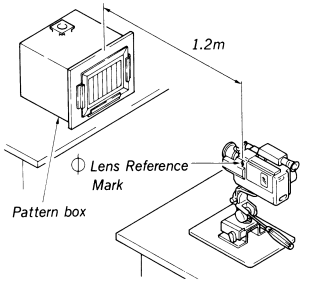
Pattern face side: (Solder Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

When indicating parts by reference number, please include the board name.

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ⚠ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

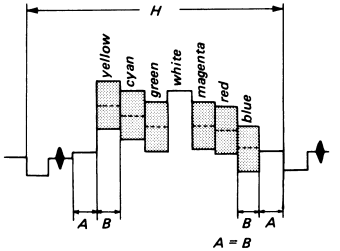


Fig. a Camera output waveform of TP803 on VC-22 board

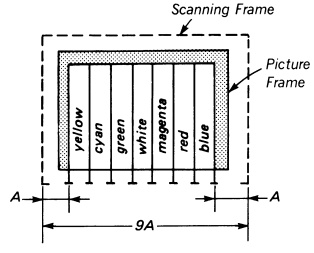
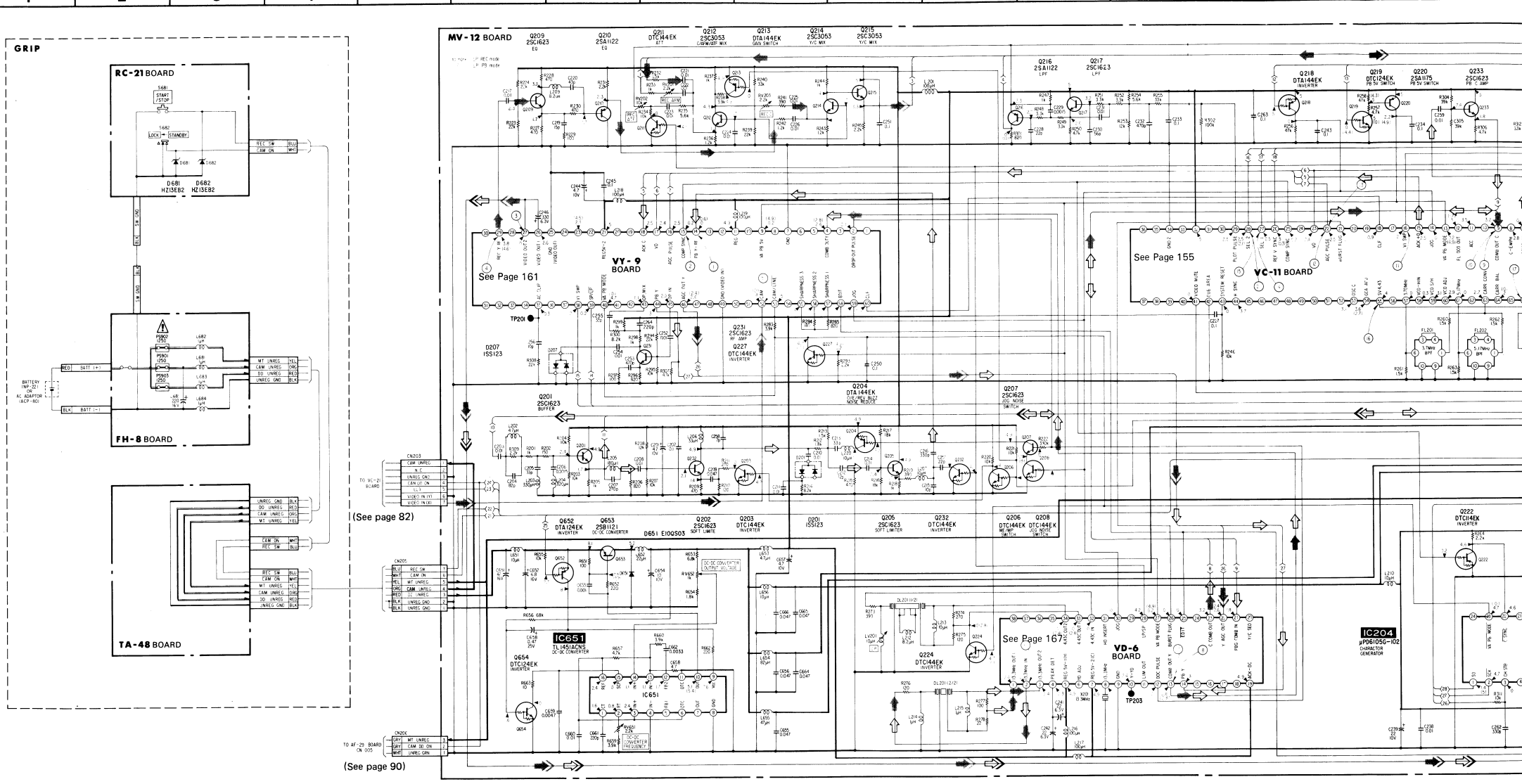


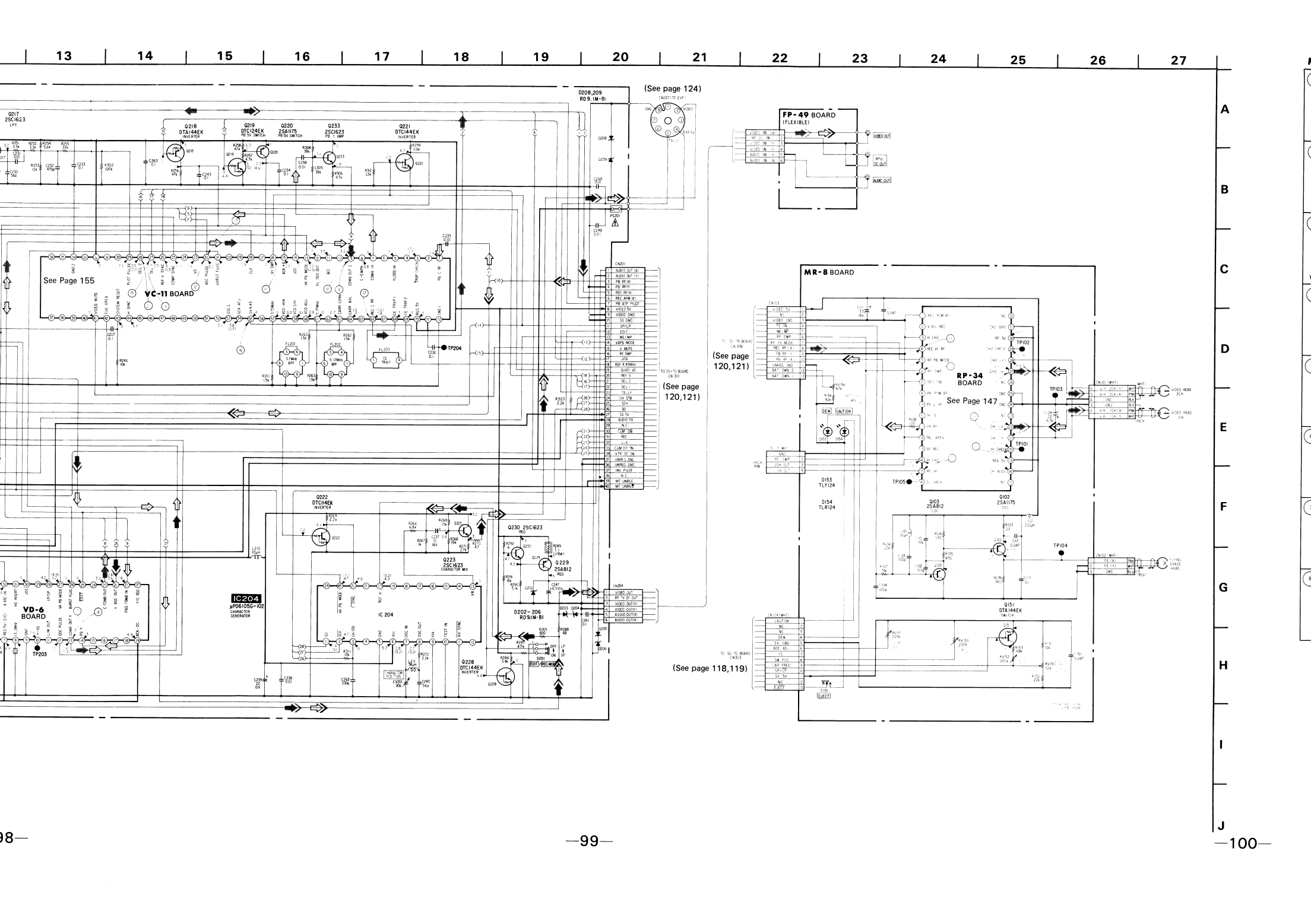
Fig. b Picture of TV monitor screen

MV-12 (VIDEO SIGNAL PROCESS), MR-8 (REC/PB AMP), TA-48 (RELAY BOARD), RC-21 (START/STOP/CAMERA ON SWITCH), FH-8 (POWER) SCHEMATIC DIAGRAMS

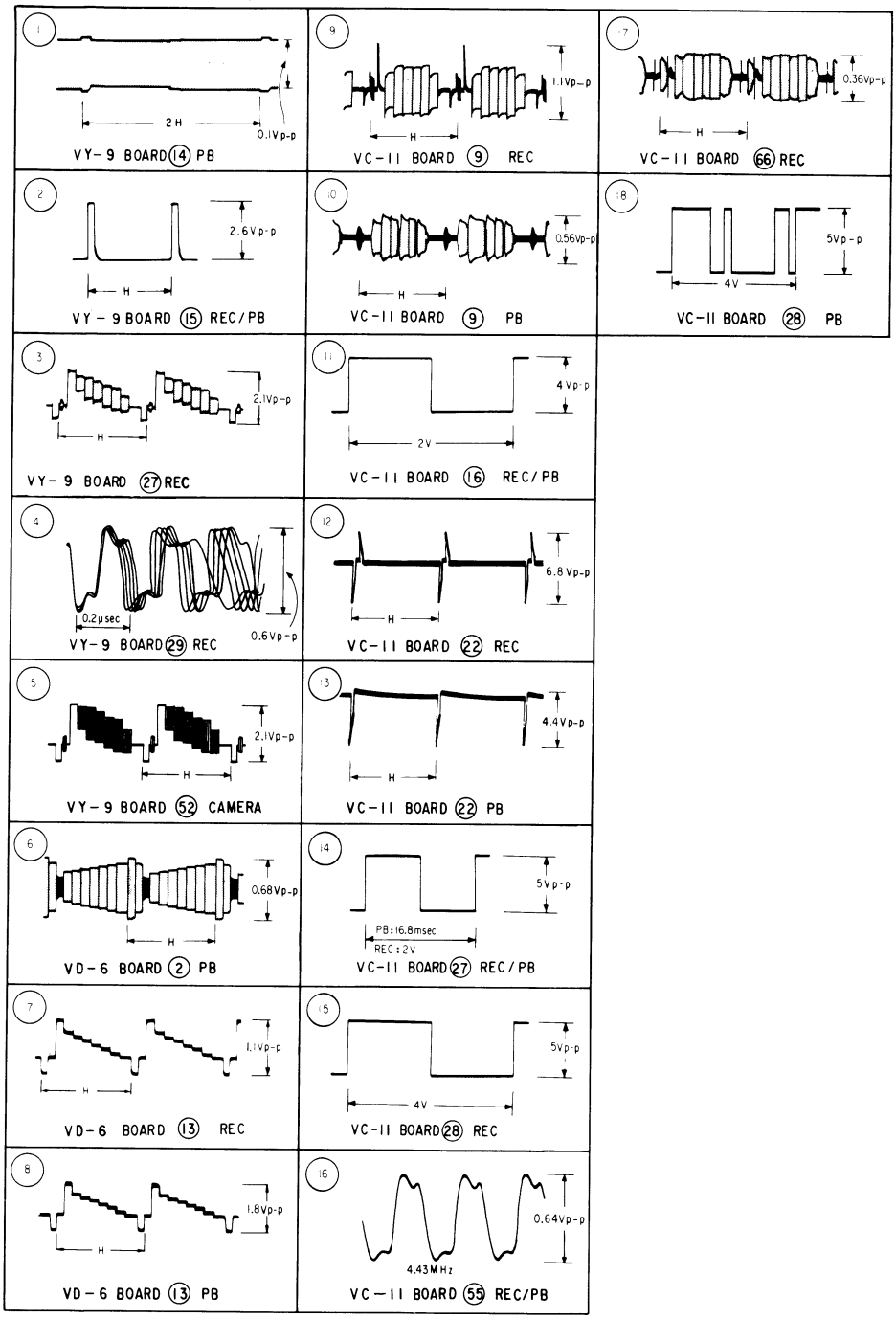
—Ref. No. MV-12 BOARD, MR-8 BOARD : 3, 000 series, RC-21 BOARD, FH-8 BOARD, TA-48 BOARD : 8, 000 series—



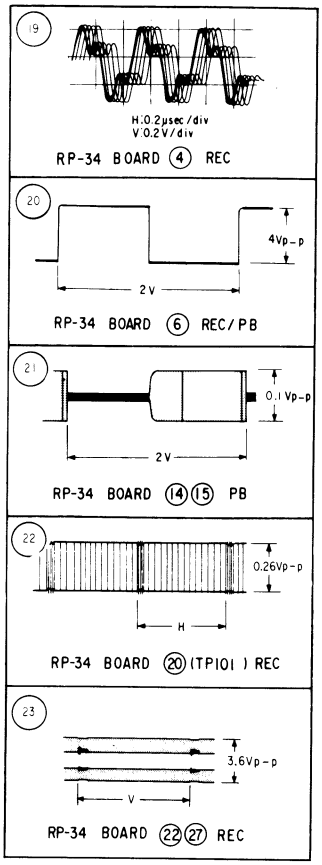
- **Signal path**
  - : REC Y Signal
  - : PB Y Signal
  - : REC CHROMA Signal
  - : PB CHROMA Signal
  - : REC Y/CHROMA Signal
  - : PB Y/CHROMA Signal


13
14
15
16
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18
19
20
21
22
23
24
25
26
27
A
B
C
D
E
F
G
H
I
J
(See page 124)
D208,209
RD9.1M-B1
FP-49 BOARD
(FLEXIBLE)
VIDEO OUT
RF1
DC OUT
AUDIO OUT
Q217
2SC1623
LPF
Q218
DTA144EK
INVERTER
Q219
DTC124EK
PB 5V SWITCH
Q220
2SA1175
PB 5V SWITCH
Q233
2SC1623
PB C AMP
Q221
DTC144EK
INVERTER
See Page 155
VC-11 BOARD
CN201
TO SS-70 BOARD
CN 301
(See page
120,121)
TP204
MR-8 BOARD
RP-34
BOARD
See Page 147
TP102
TP103
TP101
TP105
TP104
D153
TLY124
D154
TLR124
Q103
2SA812
Q102
2SA1175
Q151
DTA144EK
SWITCH
VIDEO HEAD
2CH
VIDEO HEAD
1CH
FLYING
ERASE
HEAD
(See page
120,121)
(See page 118,119)
Q222
DTC114EK
INVERTER
Q230 2SC1623
REG
Q229
2SA812
REG
Q223
2SC1623
CHARACTER MIX
IC204
μPD6105G-102
CHARACTER
GENERATOR
IC 204
Q228
DTC144EK
INVERTER
D202-206
RD9.1M-B1
VD-6
BOARD
TP203
EDIT
REC MODE
S201

MV-12 BOARD (VIDEO)



MR-8 BOARD (VIDEO)



Note:

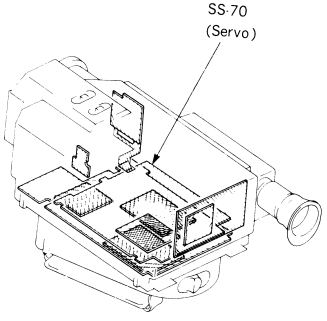
- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.
- : B+ pattern from the side which enables seeing.
- Digital transistor(SS-70: Q307,Q309,Q310,Q311,Q317,Q322, Q324,Q325,Q328,Q501,Q506,Q507,Q514,Q522,Q528,Q529, Q531,Q532)transistor with resistor.
  Refer to the SS-70 board schematic diagram for digital transistor.

Caution:

Pattern face side: (Solder Side) Parts on the pattern face side seen from the pattern face are indicated.

Parts face side: (Component Side) Parts on the parts face side seen from the parts face are indicated.

When indicating parts by reference number, please include the board name.

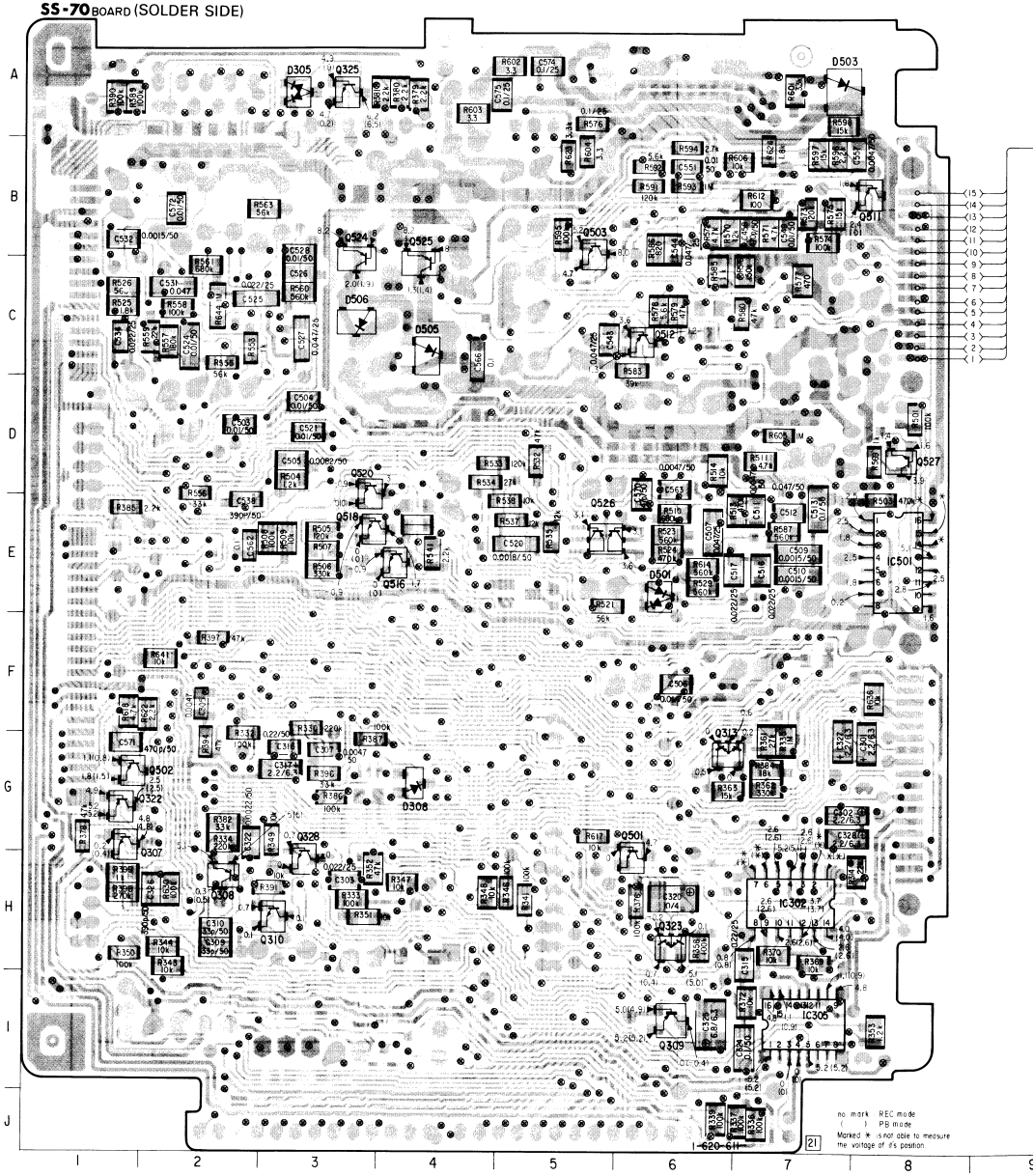


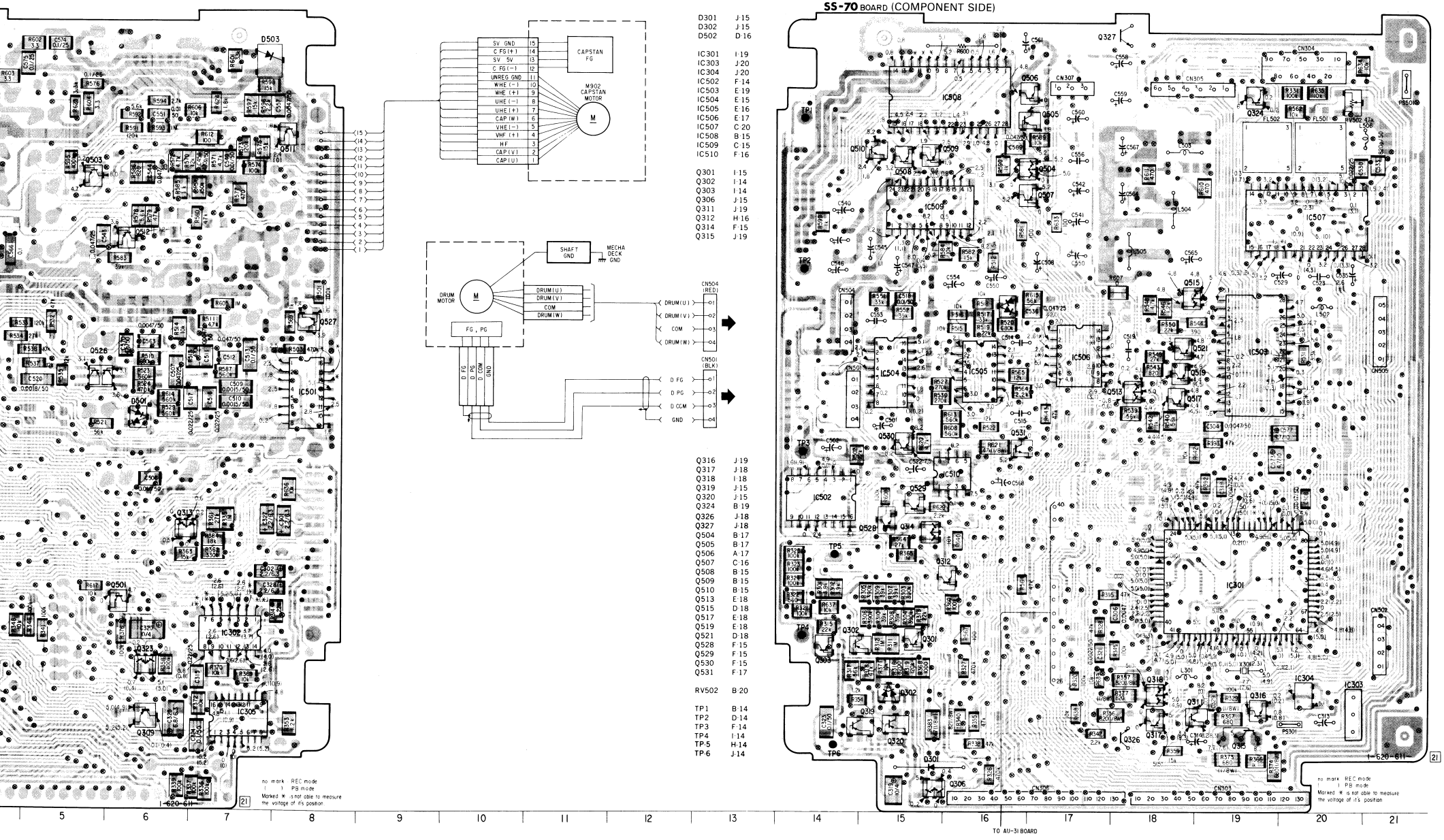
SS-70(SERVO) PRINTED WIRING BOARD

—Ref. No. SS-70 BOARD : 4, 000 series—

SS-70 BOARD (SOLDER SIDE)

D305	A 3
D308	G 4
D501	E 6
D503	A 7
D505	C 4
D506	C 3
IC302	I 7
IC305	J 7
IC501	E 8
Q307	G 1
Q308	H 2
Q309	I 6
Q310	H 3
Q321	G 3
Q322	G 1
Q323	H 6
Q325	A 3
Q328	H 3
Q501	H 6
Q502	G 2
Q503	C 5
Q511	B 8
Q512	C 6
Q514	E 5
Q516	E 4
Q518	E 4
Q520	E 4
Q524	C 3
Q525	C 4
Q526	E 6
Q527	D 8





D301 J-15
D302 J-15
D502 D-16

IC301 I-19
IC303 J-20
IC304 J-20
IC502 F-14
IC503 E-19
IC504 E-15
IC505 E-16
IC506 E-17
IC507 C-20
IC508 B-15
IC509 C-15
IC510 F-16

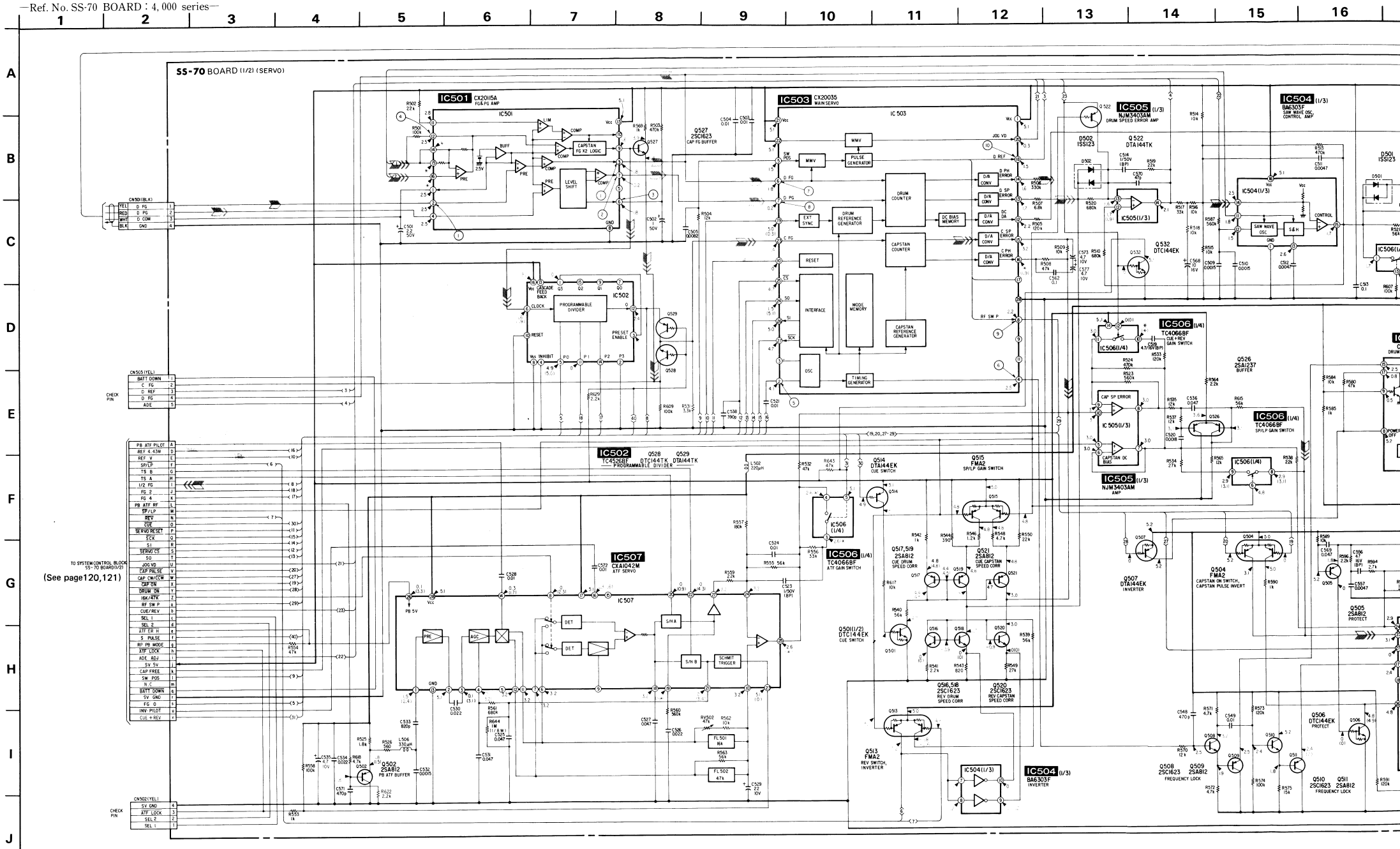
Q301 I-15
Q302 I-14
Q303 I-14
Q306 J-15
Q311 J-19
Q312 H-16
Q314 F-15
Q315 J-19
Q316 J-19
Q317 J-18
Q318 I-18
Q319 J-15
Q320 J-15
Q324 B-19
Q326 J-18
Q327 J-18
Q504 B-17
Q505 B-17
Q506 A-17
Q507 C-16
Q508 B-15
Q509 B-15
Q510 B-15
Q513 E-18
Q515 D-18
Q517 E-18
Q519 E-18
Q521 D-18
Q528 F-15
Q529 F-15
Q530 F-15
Q531 F-17

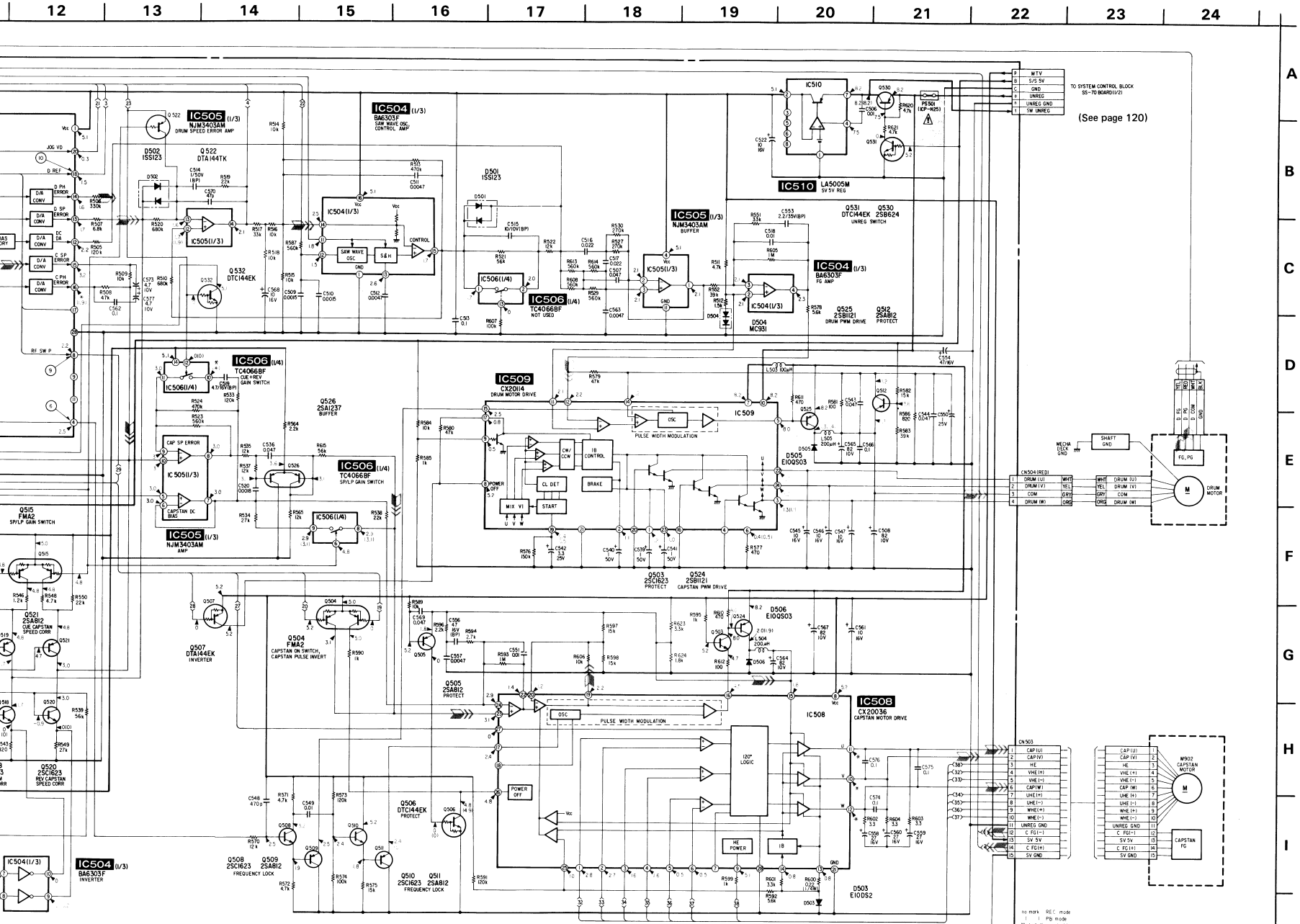
RV502 B-20

TP1 B-14
TP2 D-14
TP3 F-14
TP4 I-14
TP-5 H-14
TP-6 J-14

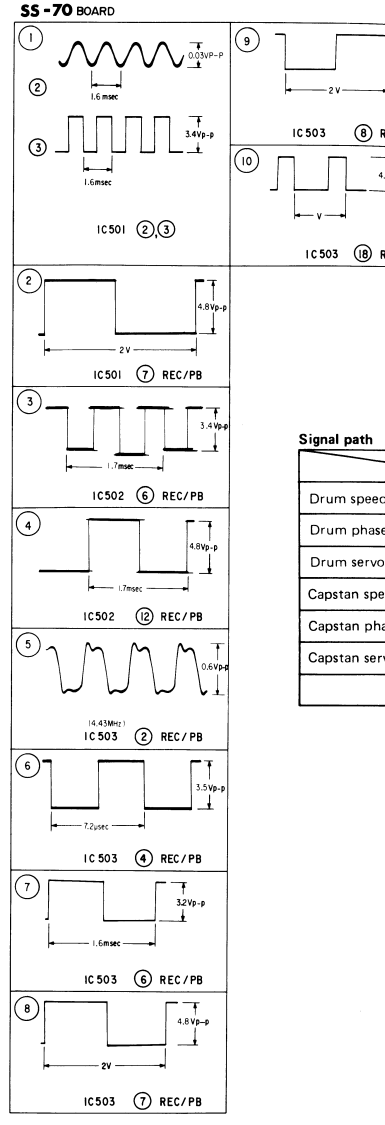
SS-70 (SERVO) SCHEMATIC DIAGRAM

—Ref. No. SS-70 BOARD : 4, 000 series—





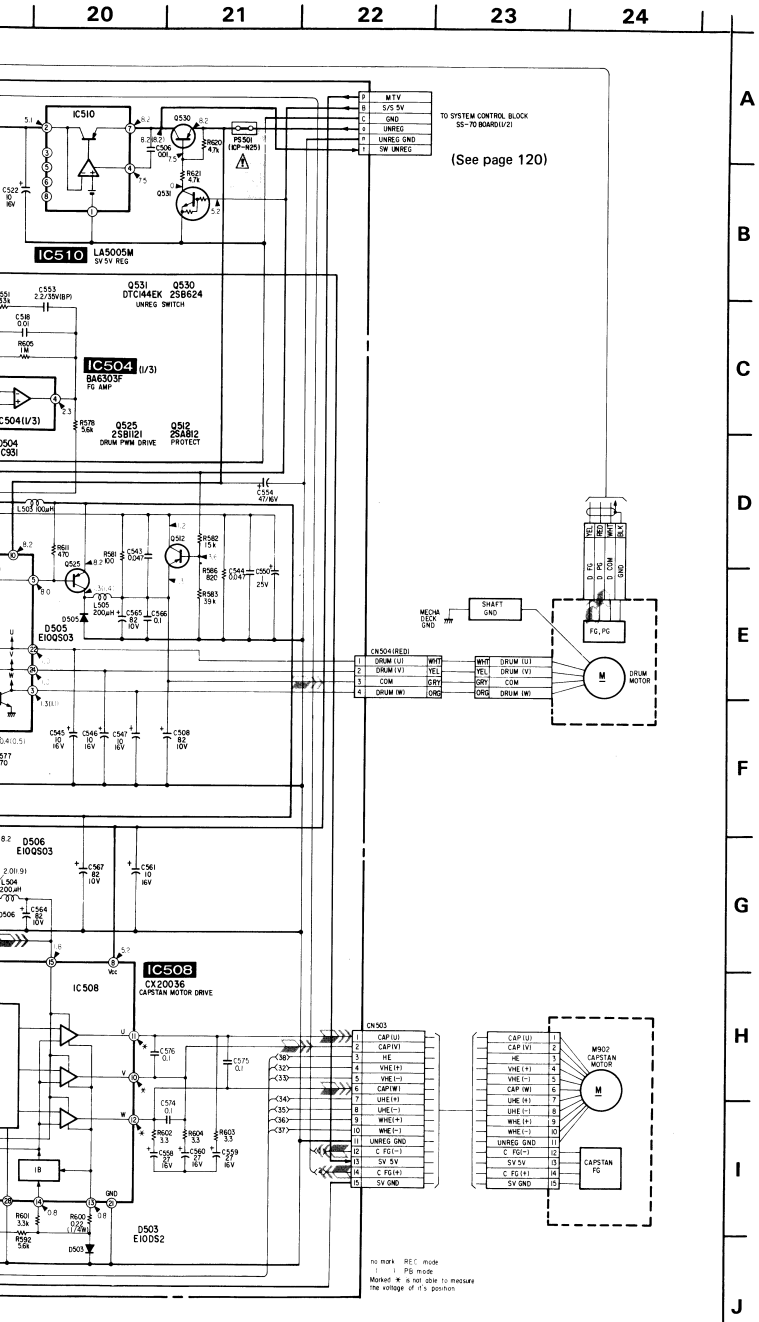
SS-70 BOARD



Signal path

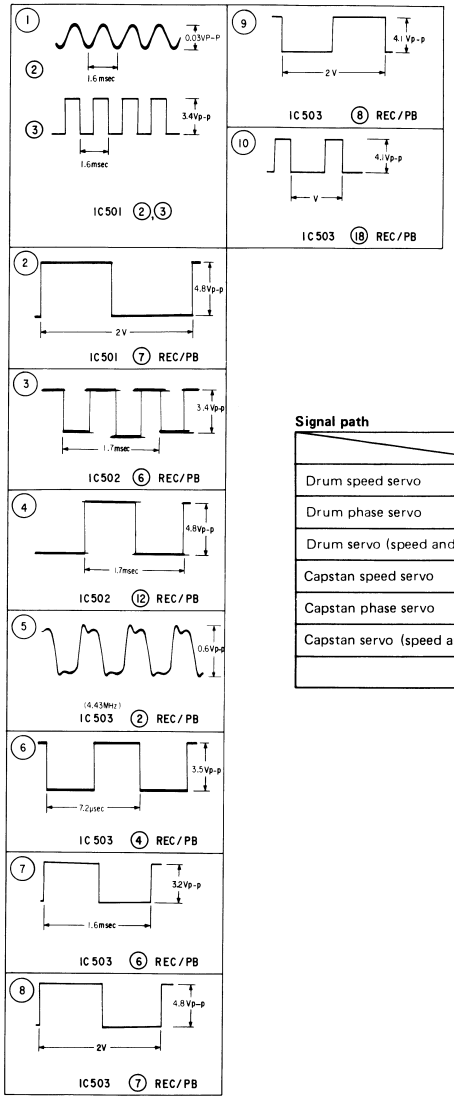
Drum speed
Drum phase
Drum servo
Capstan spe
Capstan pha
Capstan serv

Note: The components identified by shading ⚠ are critical for safety. Replace o part number specified.



no mark REC mode
( ) PB mode
Marked ✻ is not able to measure the voltage of it's position

SS-70 BOARD



Signal path

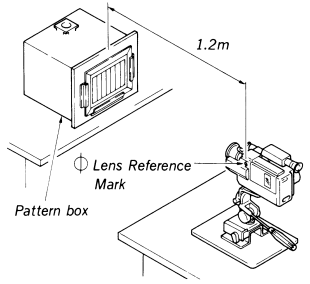
	REC	REC/PB	PB
Drum speed servo			
Drum phase servo			
Drum servo (speed and phase)			
Capstan speed servo			
Capstan phase servo			
Capstan servo (speed and phase)			

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

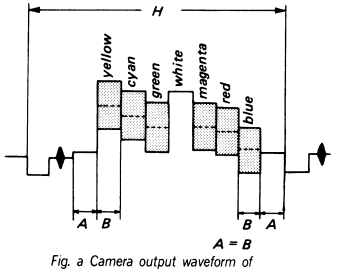


Fig. a Camera output waveform of TP803 on VC-22 board

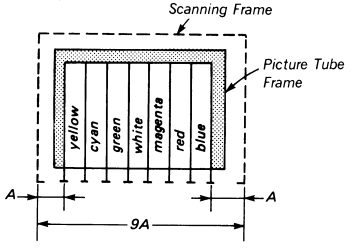


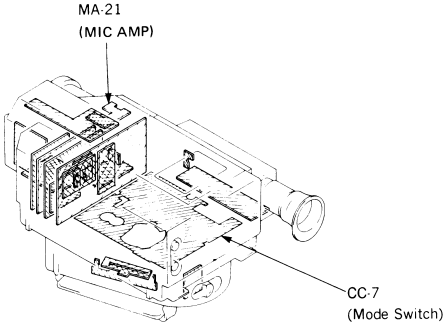
Fig. b Picture of TV monitor screen

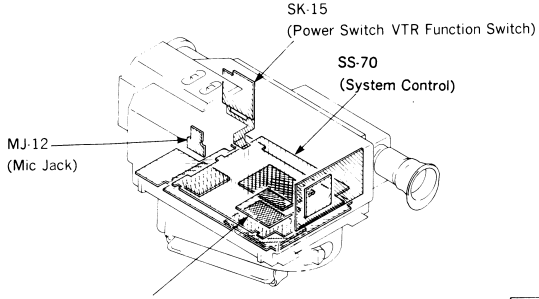
SS-70 (SYSTEM CONTROL), AU-31 (AUDIO SIGNAL PROCESS), SK-15 (POWER SWITCH/VTR FUNCTION SWITCH), MA-21 (MIC AMP), MJ-12 (MIC JACK), CC-7 (M
—Ref. No. SS-70 BOARD, SK-15 BOARD : 4, 000 series, AU-31 BOARD : 5, 000 series, MA-21 BOARD, MJ-12 BOARD : 6, 000 series—

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.
- : B+ pattern from the side which enables seeing.
- Digital transistor(SS-70:Q307,Q309,Q310,Q311,Q317,Q322, Q324,Q325,Q328,Q501,Q506,Q507,Q514,Q522,Q528,Q529, Q531,Q532)transistor with resistor.
  Refer to the SS-70 board schematic diagram for digital transistor.

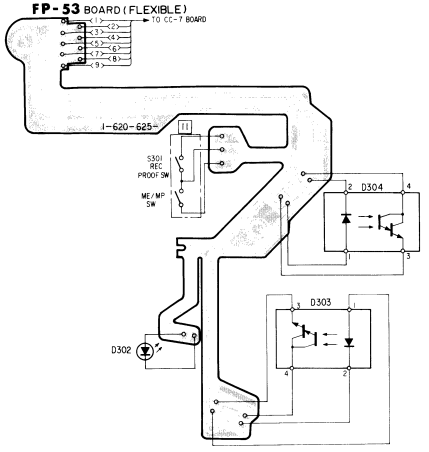
Caution:
Pattern face side: (Solder Side) Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side) Parts on the parts face side seen from the parts face are indicated.



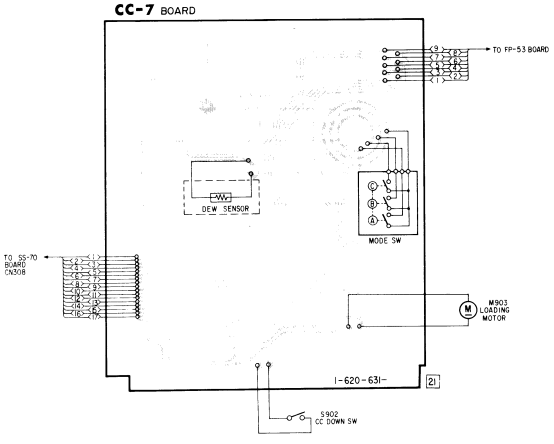


When indicating parts by reference number, please include the board name.

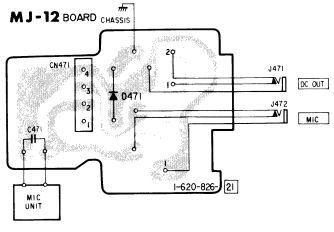
FP-53 BOARD (FLEXIBLE)



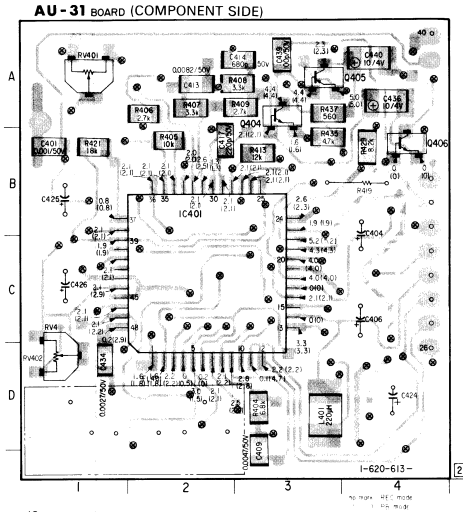
CC-7 BOARD



MJ-12 BOARD



AU-31 BOARD (COMPONENT SIDE)

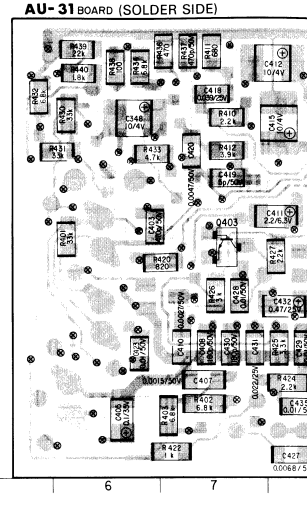


IC401 C·2

Q404 A·3
Q405 A·3
Q406 B·4

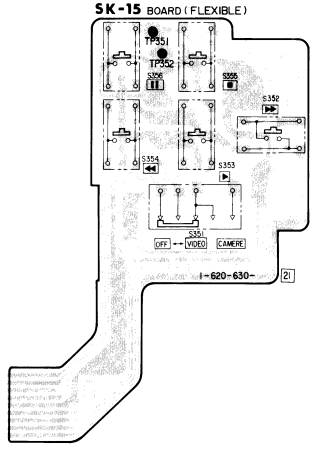
RV401 A·1
RV402 D·1

AU-31 BOARD (SOLDER SIDE)

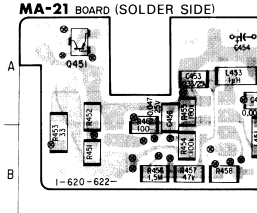


Q403 C·7

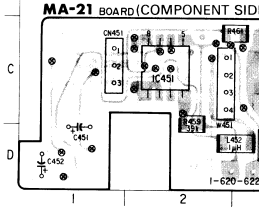
SK-15 BOARD (FLEXIBLE)



MA-21 BOARD (SOLDER SIDE)



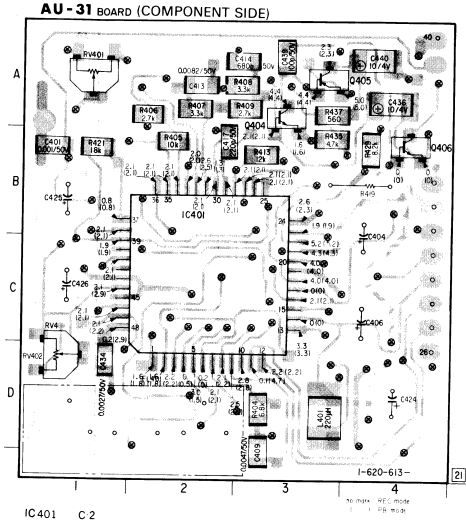
MA-21 BOARD (COMPONENT SIDE)



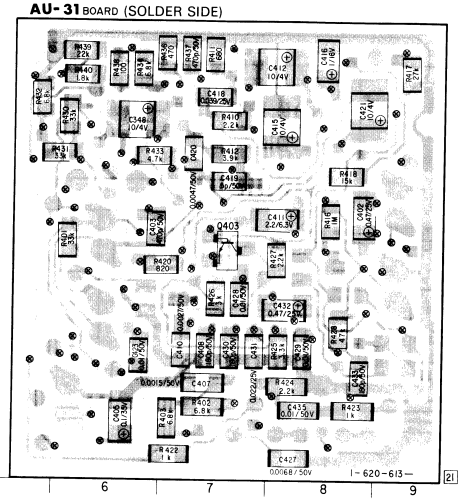
SK-15 (POWER SWITCH/VTR FUNCTION SWITCH), MA-21 (MIC AMP), MJ-12 (MIC JACK), CC-7 (MODE SWITCH) PRINTED WIRING BOARDS

: 5, 000 series, MA-21 BOARD, MJ-12 BOARD : 6, 000 series—

AU-31 BOARD (COMPONENT SIDE)



AU-31 BOARD (SOLDER SIDE)



D305	A-3
D308	G-4
D501	E-6
D503	A-7
D505	C-4
D506	C-3
IC302	I-7
IC305	J-7
IC501	E-8
Q307	G-1
Q308	H-2
Q309	I-6
Q310	H-3
Q321	G-3
Q322	G-1
Q323	H-6
Q325	A-3
Q328	H-3
Q501	H-6
Q502	G-2
Q503	C-5
Q511	B-8
Q512	C-6
Q514	E-5
Q516	E-4
Q518	E-4
Q520	E-4
Q524	C-3
Q525	C-4
Q526	E-6
Q527	D-8

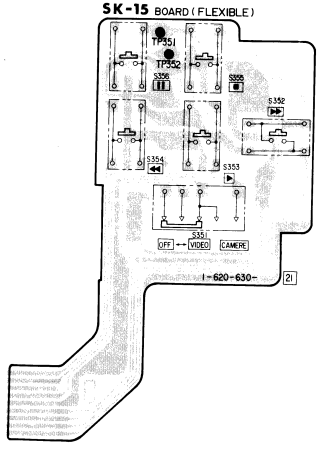
IC401	C-2
Q404	A-3
Q405	A-3
Q406	B-4
RV401	A-1
RV402	D-1

Q403 C-7

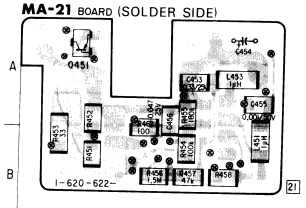
SS-70 BOARD (SOLDER SIDE)



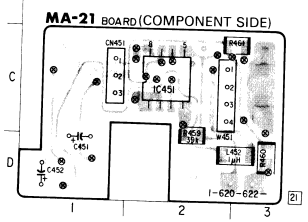
SK-15 BOARD (FLEXIBLE)



MA-21 BOARD (SOLDER SIDE)

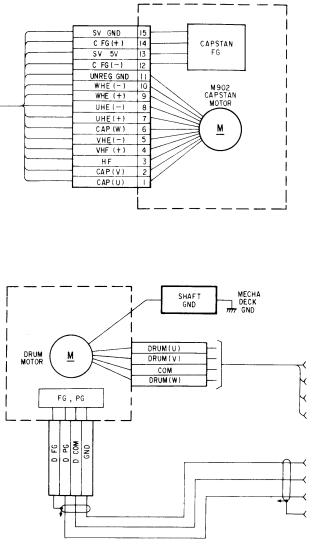


MA-21 BOARD (COMPONENT SIDE)



O BOARD (SOLDER SIDE)





D301 J-15
D302 J-15
D502 D-16

IC301 I-19
IC303 J-20
IC304 J-20
IC502 F-14
IC503 E-19
IC504 E-15
IC505 E-16
IC506 E-17
IC507 C-20
IC508 B-15
IC509 C-15
IC510 F-16

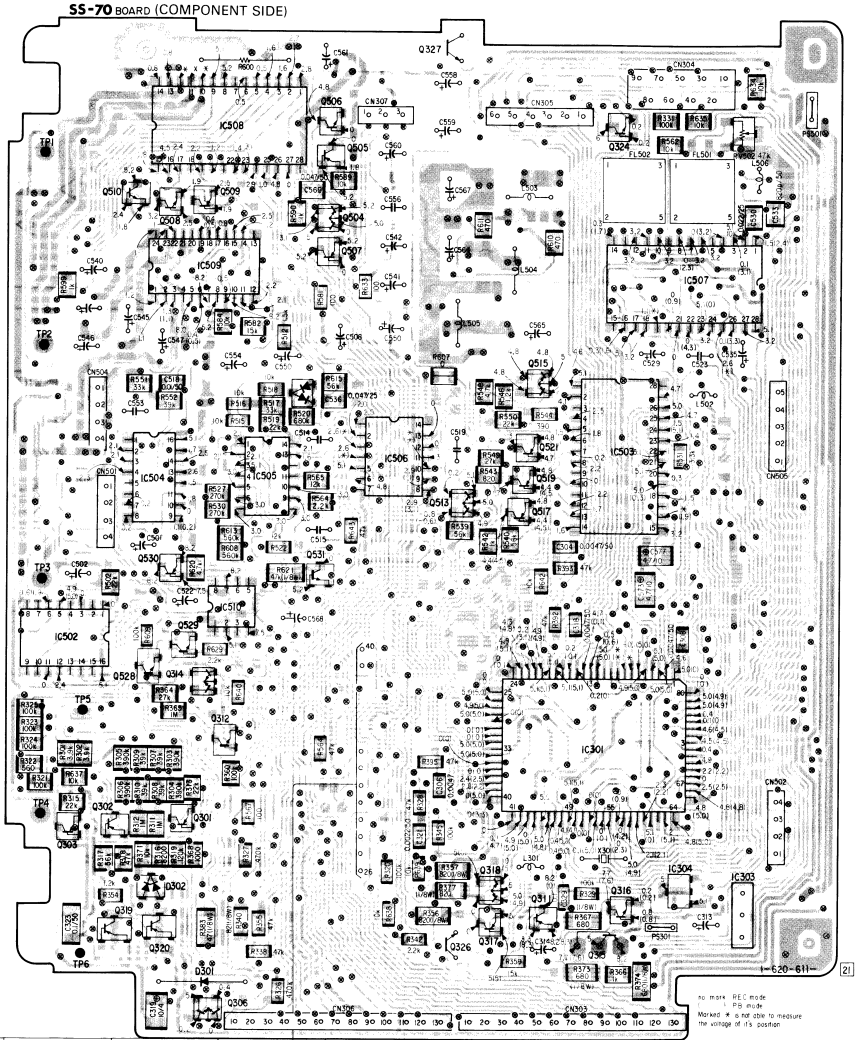
Q301 I-15
Q302 I-14
Q303 I-14
Q306 J-15
Q311 J-19
Q312 H-16
Q314 F-15
Q315 J-19

Q316 J-19
Q317 J-18
Q318 I-18
Q319 J-15
Q320 J-15
Q324 B-19
Q326 J-18
Q327 J-18
Q504 B-17
Q505 B-17
Q506 A-17
Q507 C-16
Q508 B-15
Q509 B-15
Q510 B-15
Q513 E-18
Q515 D-18
Q517 E-18
Q519 E-18
Q521 D-18
Q528 F-15
Q529 F-15
Q530 F-15
Q531 F-17

RV502 B-20

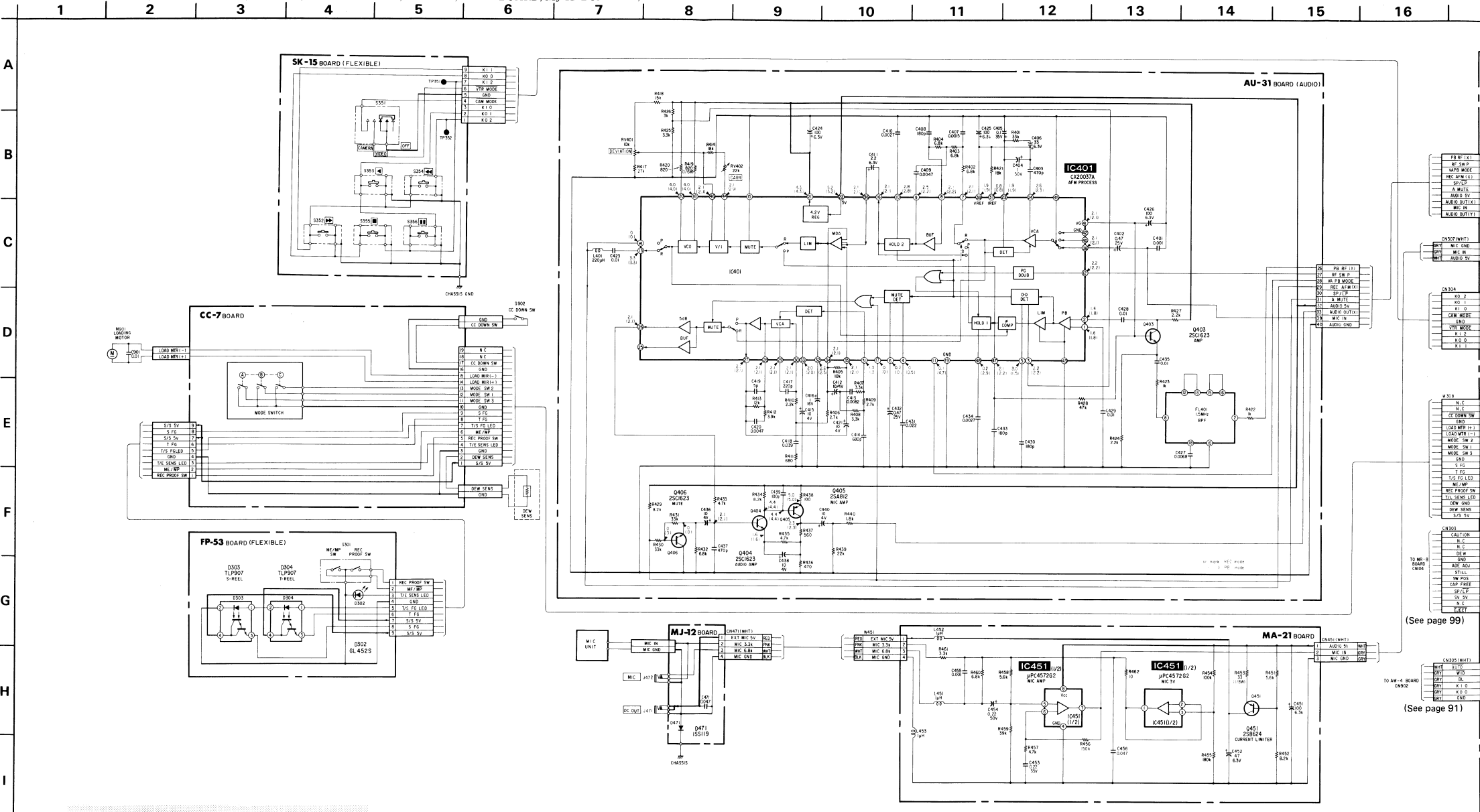
TP1 B-14
TP2 D-14
TP3 F-14
TP4 I-14

SS-70 BOARD (COMPONENT SIDE)

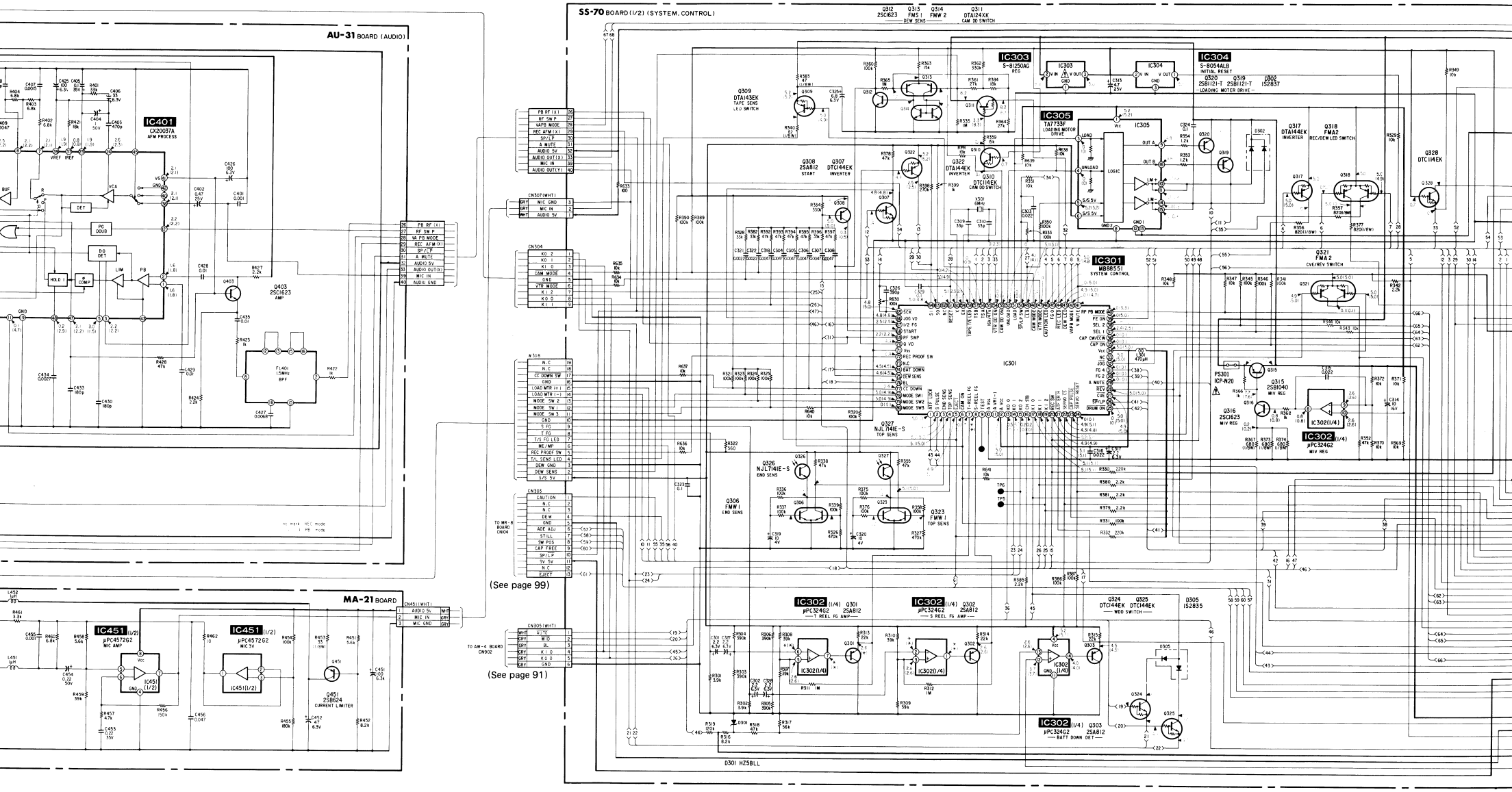


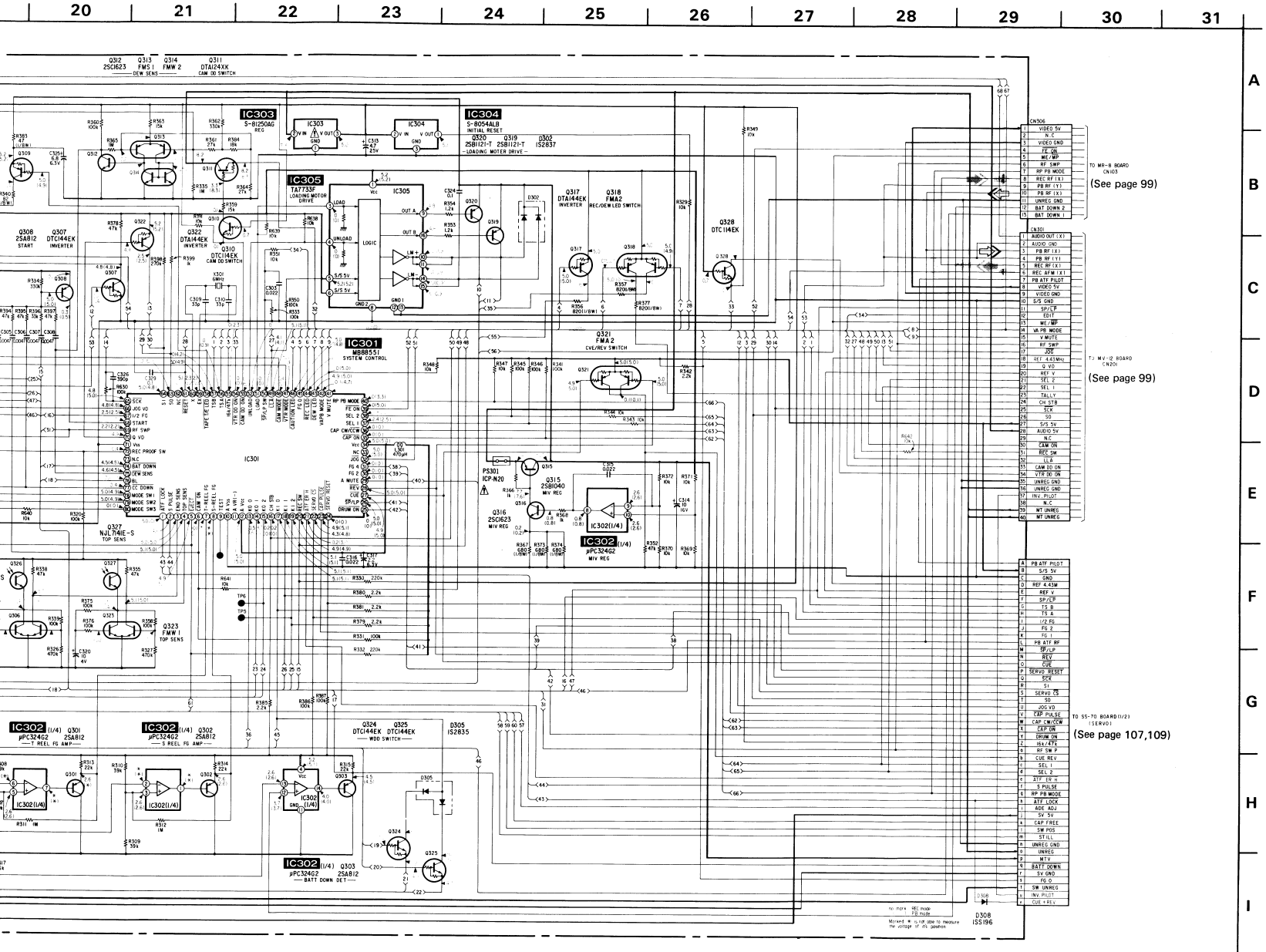
SS-70 (SYSTEM CONTROL), AU-31 (AUDIO SIGNAL PROCESS), SK-15 (POWER SWITCH/VTR FUNCTION SWITCH), MA-21 (MIC AMP), MJ-12 (MIC JACK), CC-7 (MODE SWITCH) SCHEMATIC DIAGRAMS

—Ref. No. SS-70 BOARD, SK-15 BOARD : 4,000 series, AU-31 BOARD : 5,000 series, MA-21 BOARD, MJ-12 BOARD : 6,000 series—



Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.


11
12
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27
AU-31 BOARD (AUDIO)
IC401
CX20037A
AFM PROCESS
Q403
2SC1623
AMP
F1401
15MHz
BPF
MA-21 BOARD
IC451 (1/2)
μPC4572G2
MIC AMP
IC451 (1/2)
μPC4572G2
MIC SW
Q451
2SB624
CURRENT LIMITER
SS-70 BOARD (1/2) (SYSTEM. CONTROL)
IC303
S-81250AG
REG
IC304
S-80544LB
INITIAL RESET
IC305
TA7733F
LOADING MOTOR DRIVE
IC301
M88851
SYSTEM CONTROL
IC301
IC302 (1/4)
μPC324G2
T REEL FG AMP
IC302 (II/4)
μPC324G2
S REEL FG AMP
IC302 (II/4)
μPC324G2
BATT DOWN DET
Q309
DTA143EK
TAPE SENS
Q308
2SA812
START
Q307
DTC144EK
INVERTER
Q322
DTA144EK
INVERTER
Q310
DTC144EK
CAM DO SWITCH
Q306
FMW1
END SENS
Q326
NJL7141E-S
END SENS
Q327
NJL7141E-S
TOP SENS
Q323
FMW1
TOP SENS
Q324
DTC144EK
WDO SWITCH
Q325
DTC144EK
Q328
DTC144EK
Q317
DTA144EK
INVERTER
Q318
FMA2
REC/DEW LED SWITCH
Q321
FMA2
CVE/REV SWITCH
Q315
2SB1040
MIV REG
Q316
2SC1623
MIV REG
PS301
ICP-N20
D301
HZ5BLL
(See page 99)
(See page 91)
TO MR-8 BOARD CN604
TO AM-4 BOARD CN902

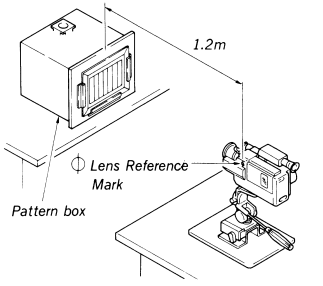


- **Signal path**
  - REC Y/CHROMA Signal
  - PB Y/CHROMA Signal

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in µF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

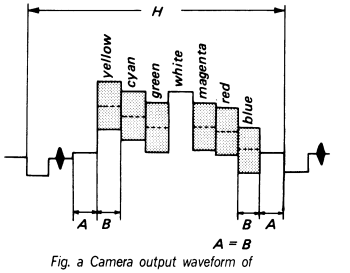


Fig. a Camera output waveform of TP803 on VC-22 board

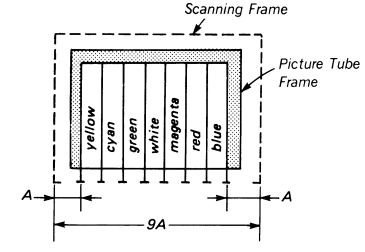


Fig. b Picture of TV monitor screen

VF-10 (VIEWFINDER), LD-7 (LED) PRINTED WIRING BOARDS

—Ref. No. VF-10 BOARD, LD-7 BOARD : 7, 000 series—

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.
- : B+ pattern from the side which enables seeing.

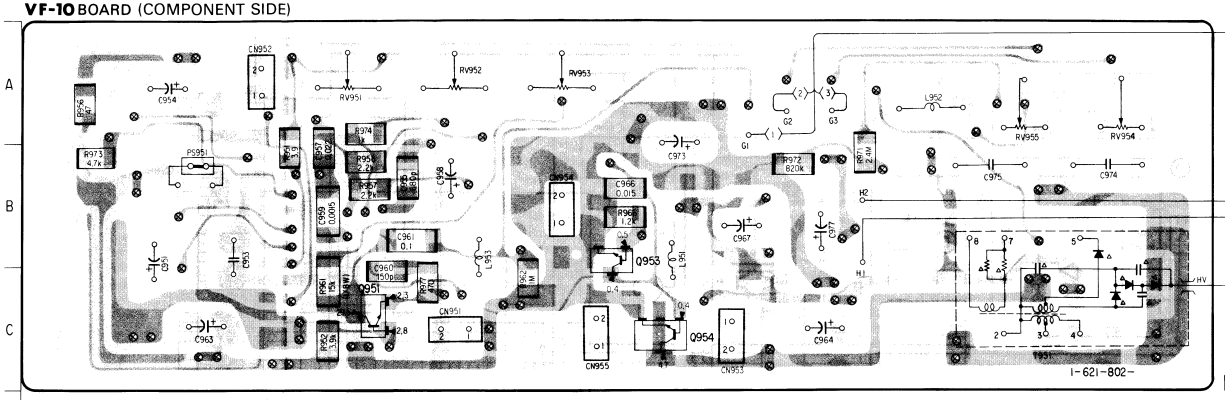
Caution:

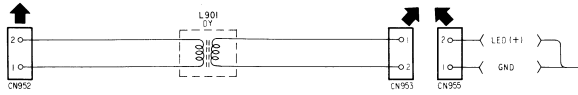
Pattern face side: (Solder Side) Parts on the pattern face side seen from the pattern face are indicated.

Parts face side: (Component Side) Parts on the parts face side seen from the parts face are indicated.

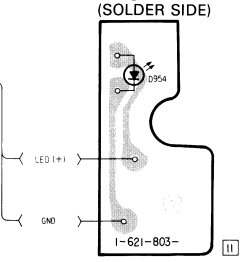
When indicating parts by reference number, please include the board name.

VF-10 BOARD (COMPONENT SIDE)

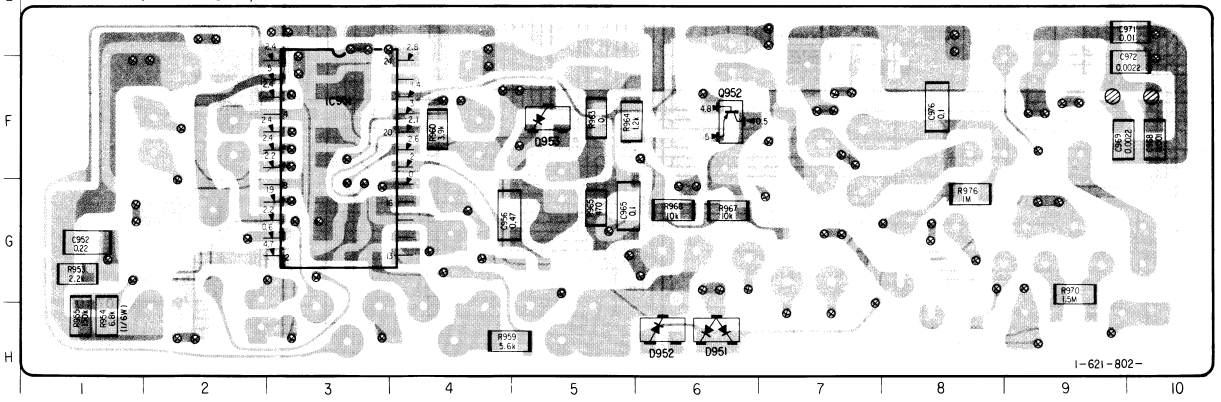




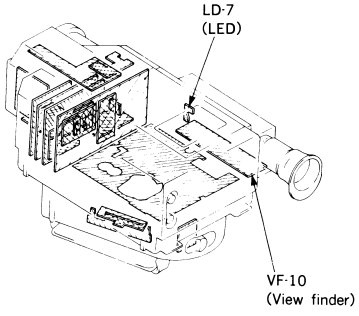
LD-7 BOARD (SOLDER SIDE)



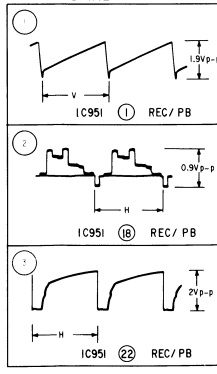
VF-10 BOARD (SOLDER SIDE)



D951	H-6	
D952	H-6	
D953	F-5	
IC951	F-3	
Q951	C-3	
Q952	F-6	
Q953	B-5	
Q954	C-6	
RV951	A-3	
RV952	A-4	
RV953	A-5	
RV954	A-9	
RV955	A-10	

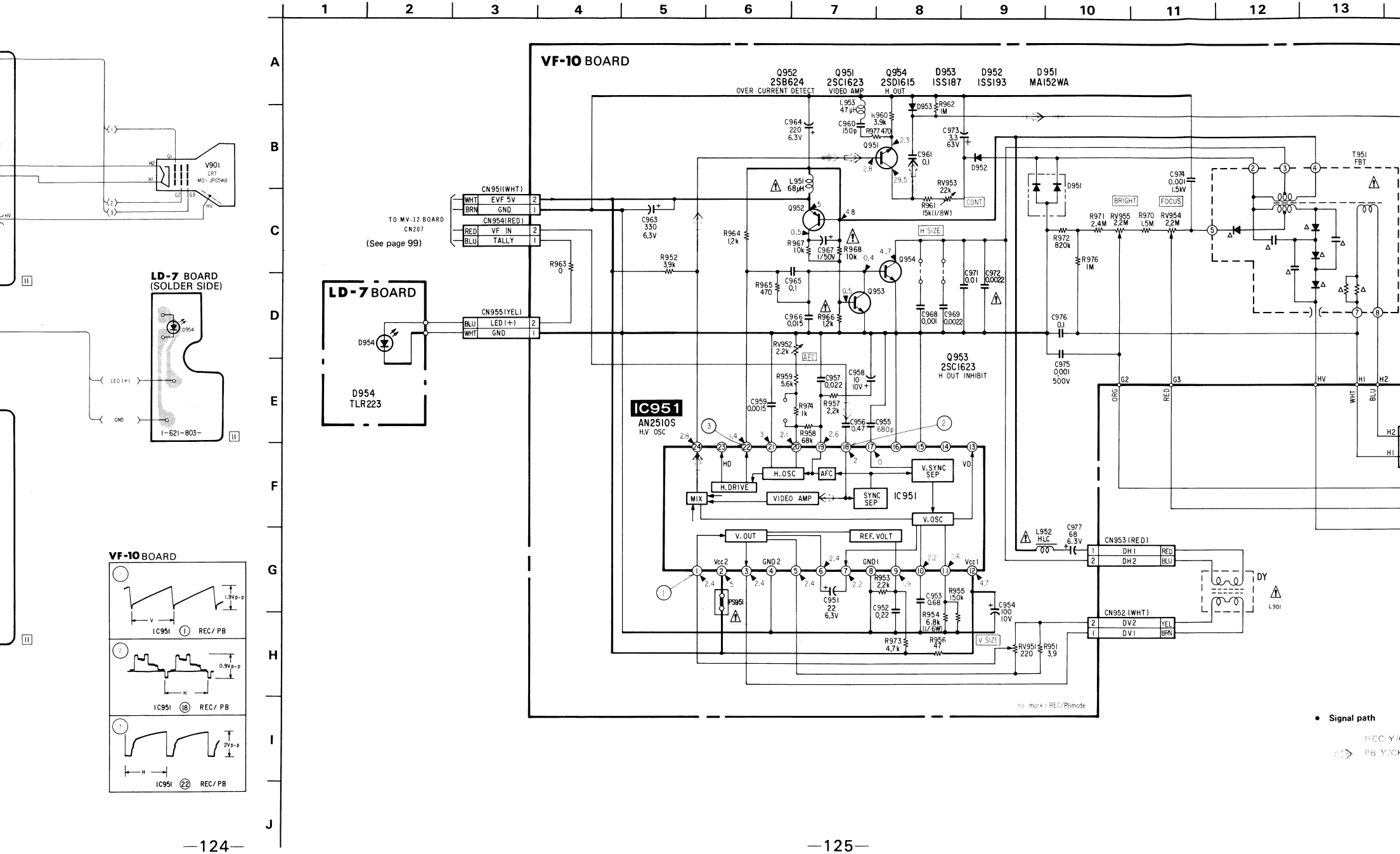


VF-10 BOARD



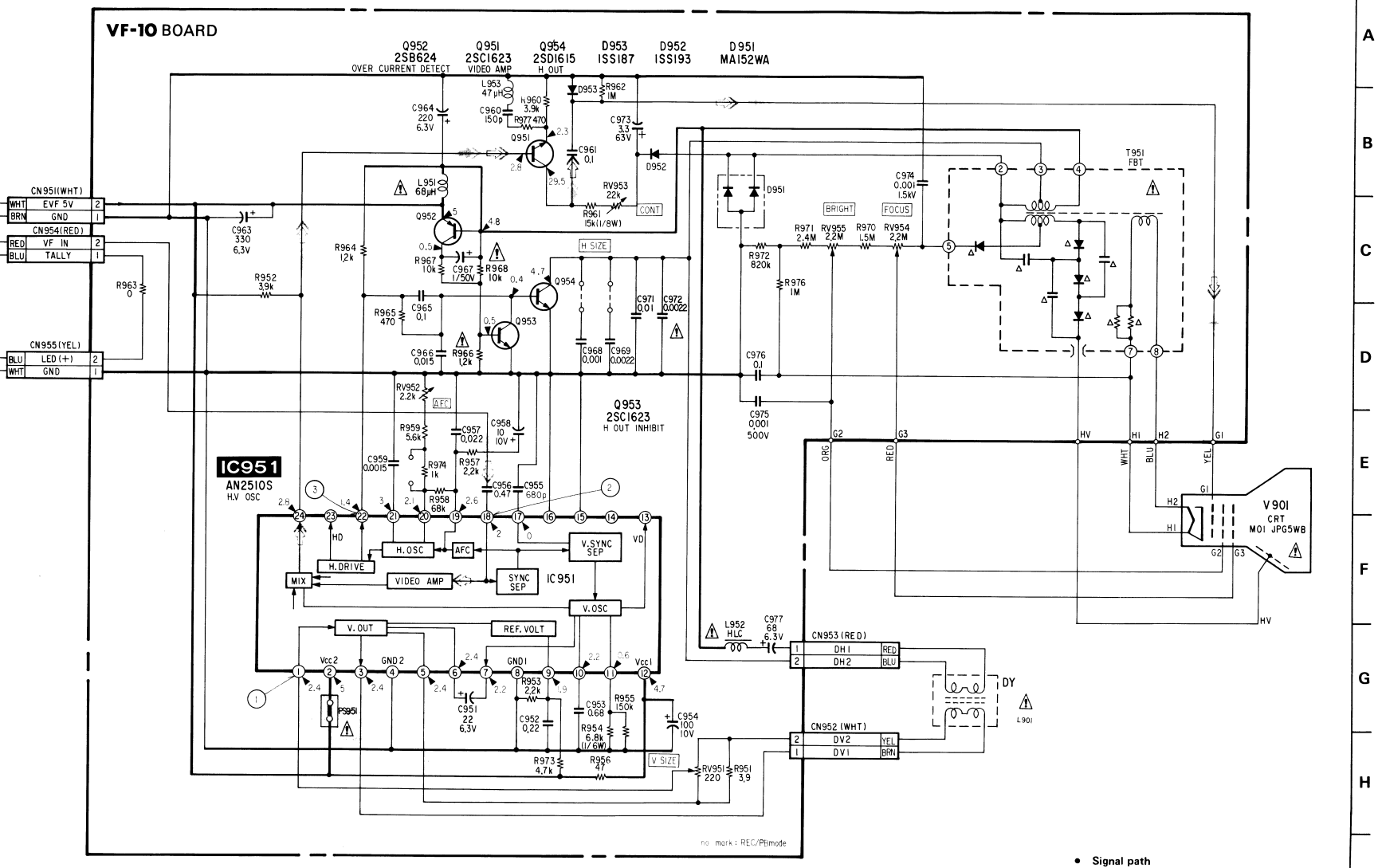
VF-10 (VIEWFINDER), LD-7 (LED) SCHEMATIC DIAGRAMS

—Ref. No. VF-10 BOARD, LD-7 BOARD : 7,000 series—



VF-10 BOARD

VF-10 BOARD



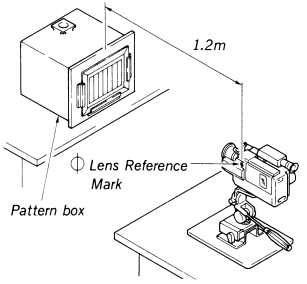
- **Signal path**

REC Y/CHROMA Signal
PB Y/CHROMA Signal

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

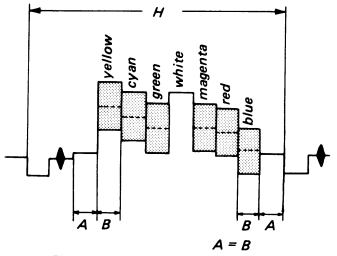


Fig. a Camera output waveform of TP803 on VC-22 board

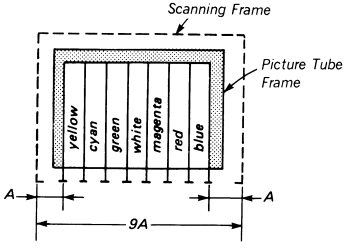


Fig. b Picture of TV monitor screen

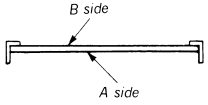
DT-61 (CCD DRIVE, TIMING GENERATOR) PRINTED WIRING BOARD

—Ref. No. DT-61 BOARD : 1, 600 series—

Be sure to always read "Note on replacing the CCD imager block" in page 74 when replacing the VC-20 complete board, DT-61 complete board, and CCD imager block (IC701 on the VC-20 board and IC002 on the DT-61 board).

Note:

- ○– : indicates a lead wire mounted on the component side.
- ●– : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.
- : B+ pattern from the side which enables seeing.
- : Printed resistor.



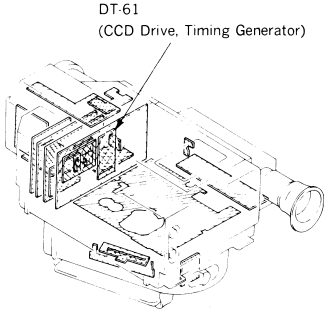
Note

Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.

Component side (SIDE B) : Parts on the component side being seen from the component are stated.

Regarding color indication of patterns

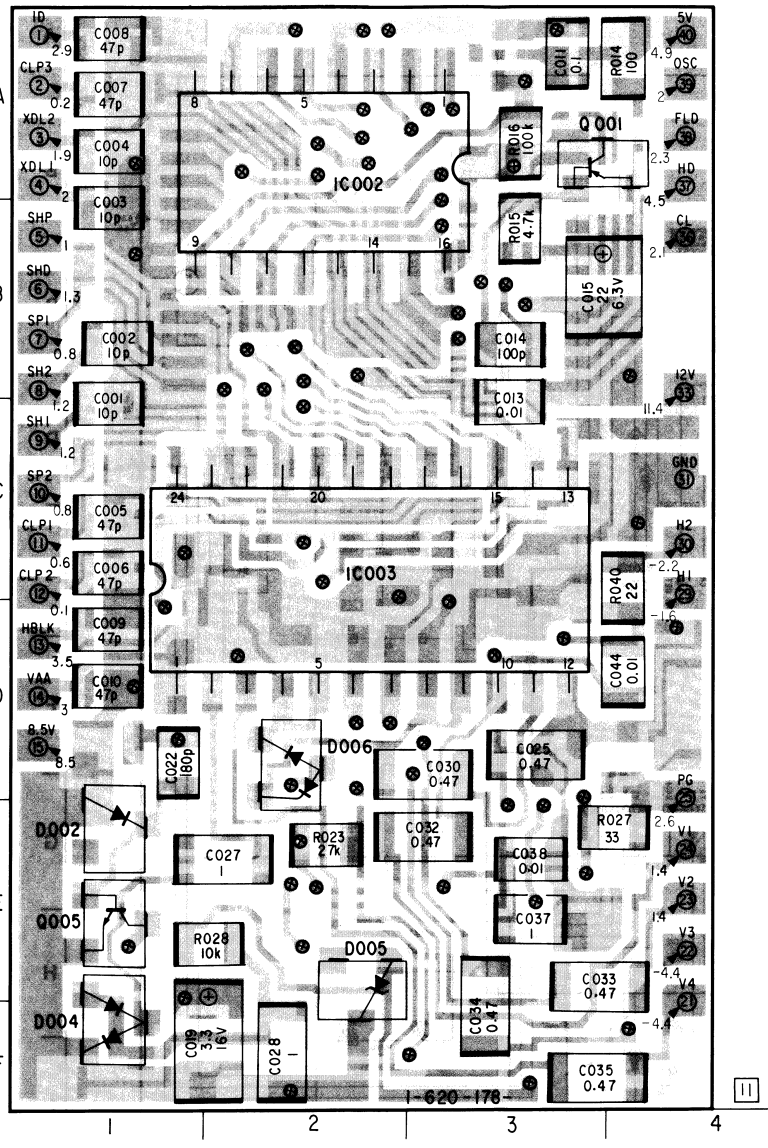
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.



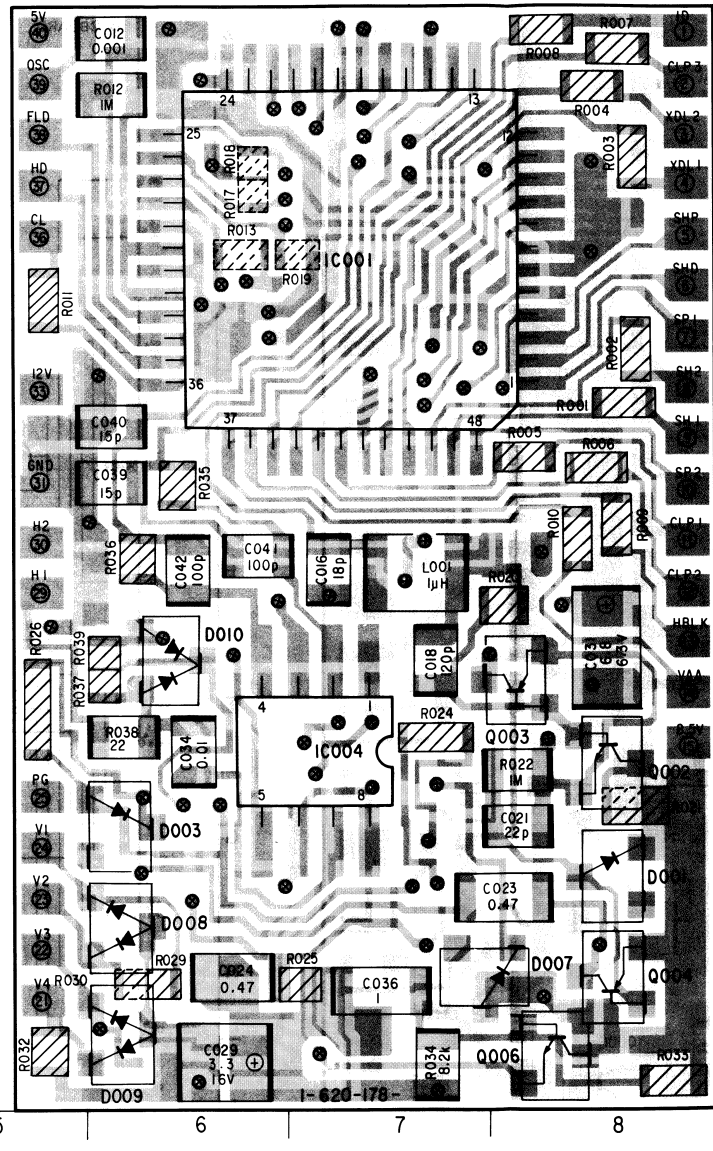
When indicating parts by reference number, please include the board name.

DT-61 BOARD(SIDE B)

REC mode

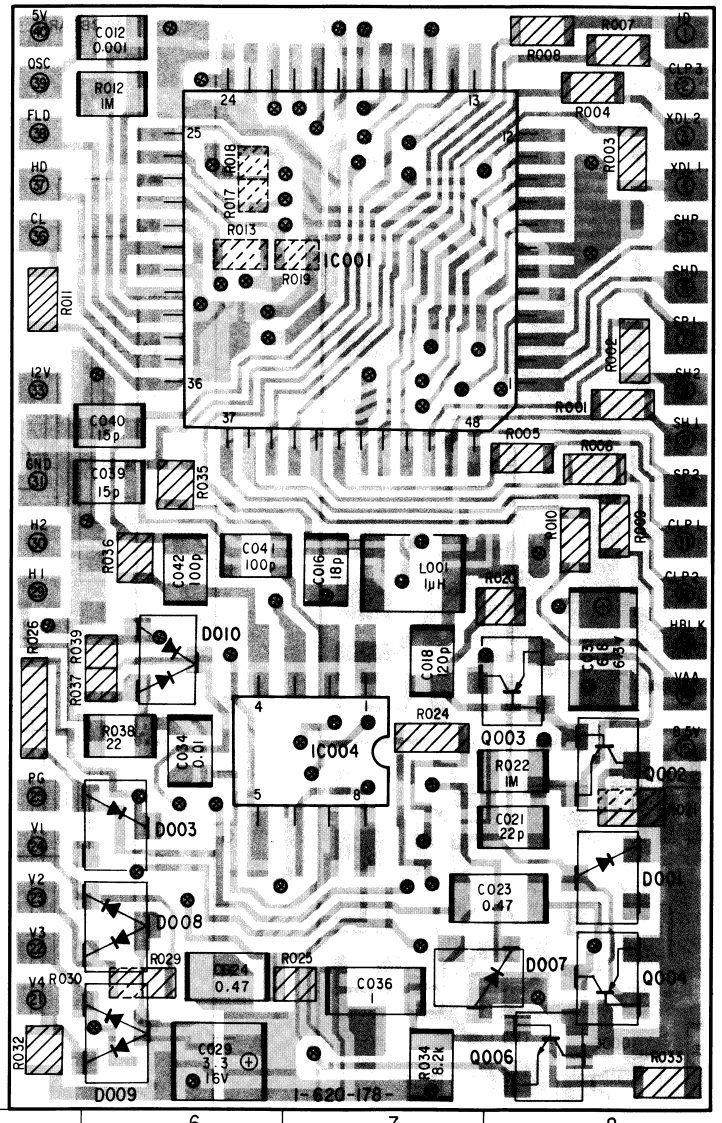


DT-61 BOARD(SIDE A)



Be sure to always read "Note on replacing the CCD imager block" in page 74 when replacing the VC-20 complete board, DT-61 complete board, and CCD imager block (IC701 on the VC-20 board and IC002 on the DT-61 board).

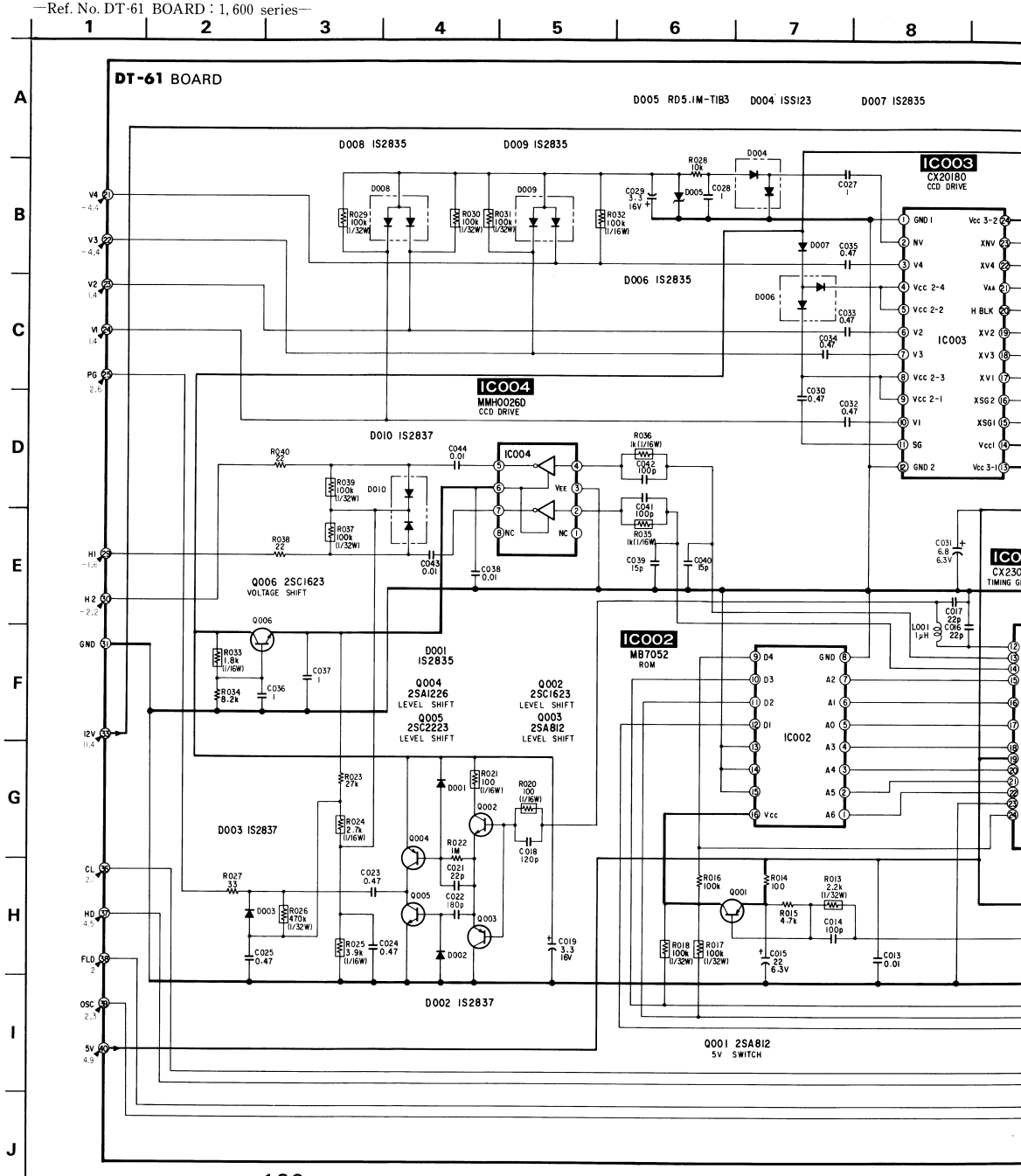
DT-61 BOARD(SIDE A)



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DT-61 (CCD DRIVE, TIMING GENERATOR) SCHEMATIC DIAGRAM

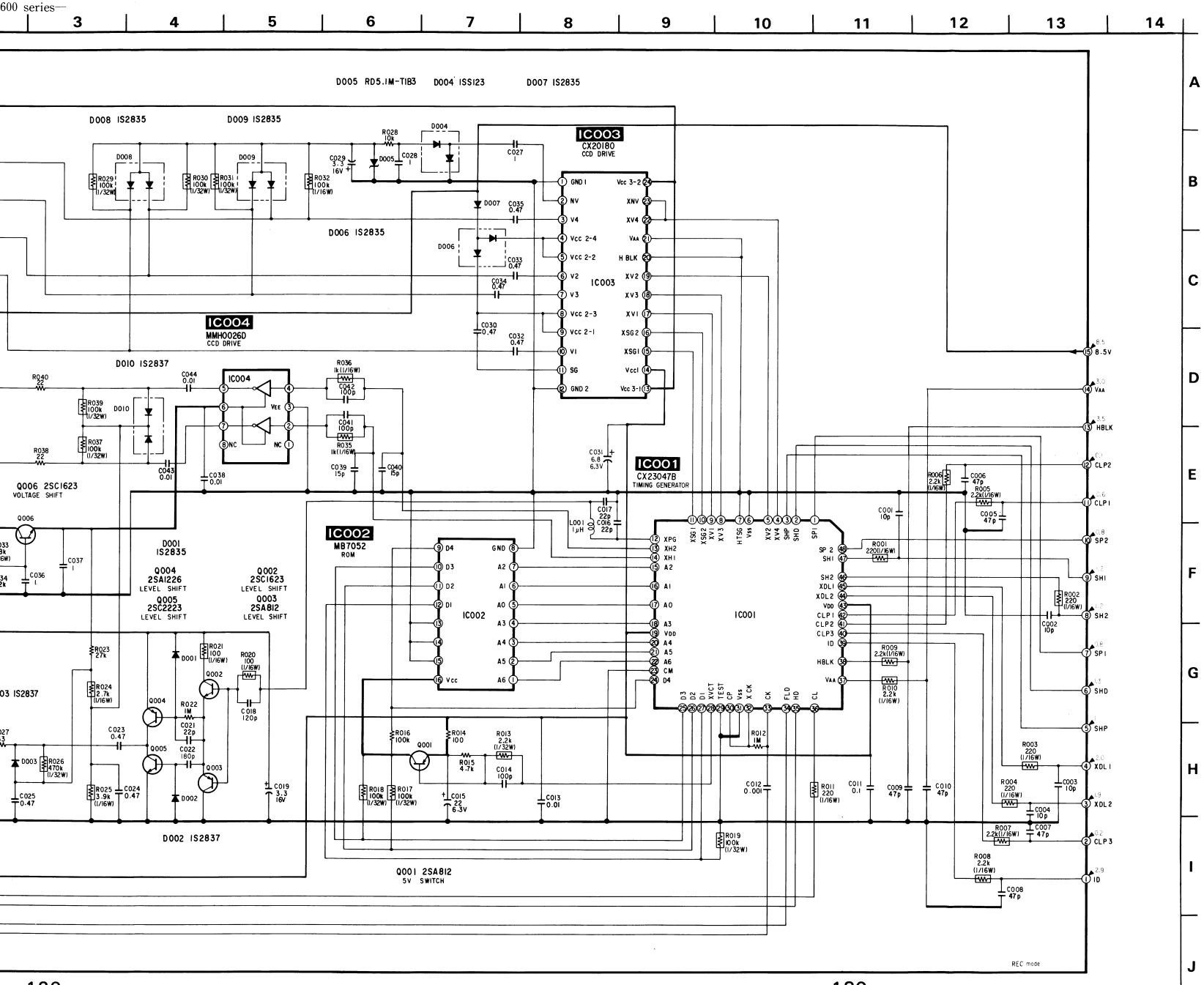
—Ref. No. DT-61 BOARD : 1, 600 series—



—129—

G GENERATOR) SCHEMATIC DIAGRAM

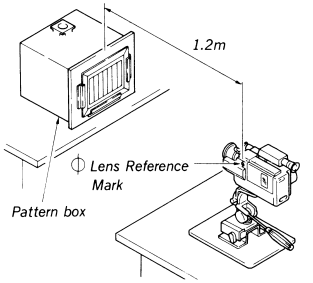
600 series—



Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ⏦ : printed resistor.
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

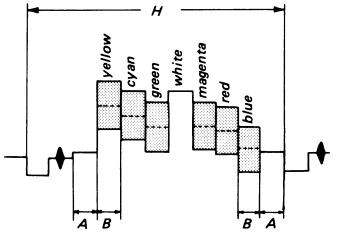


Fig. a Camera output waveform of TP803 on VC-22 board

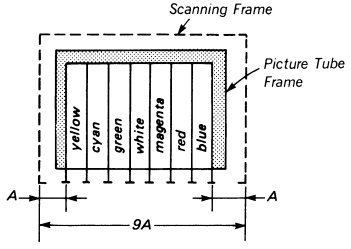
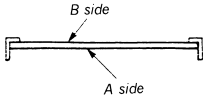


Fig. b Picture of TV monitor screen

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.
- : B+ pattern from the side which enables seeing.
- : Printed resistor.



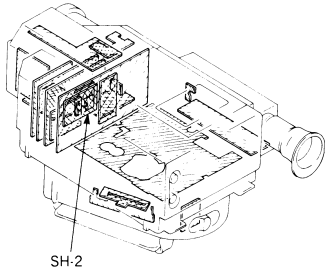
Note

Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.

Component side (SIDE B) : Parts on the component side being seen from the component are stated.

Regarding color indication of patterns

- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.

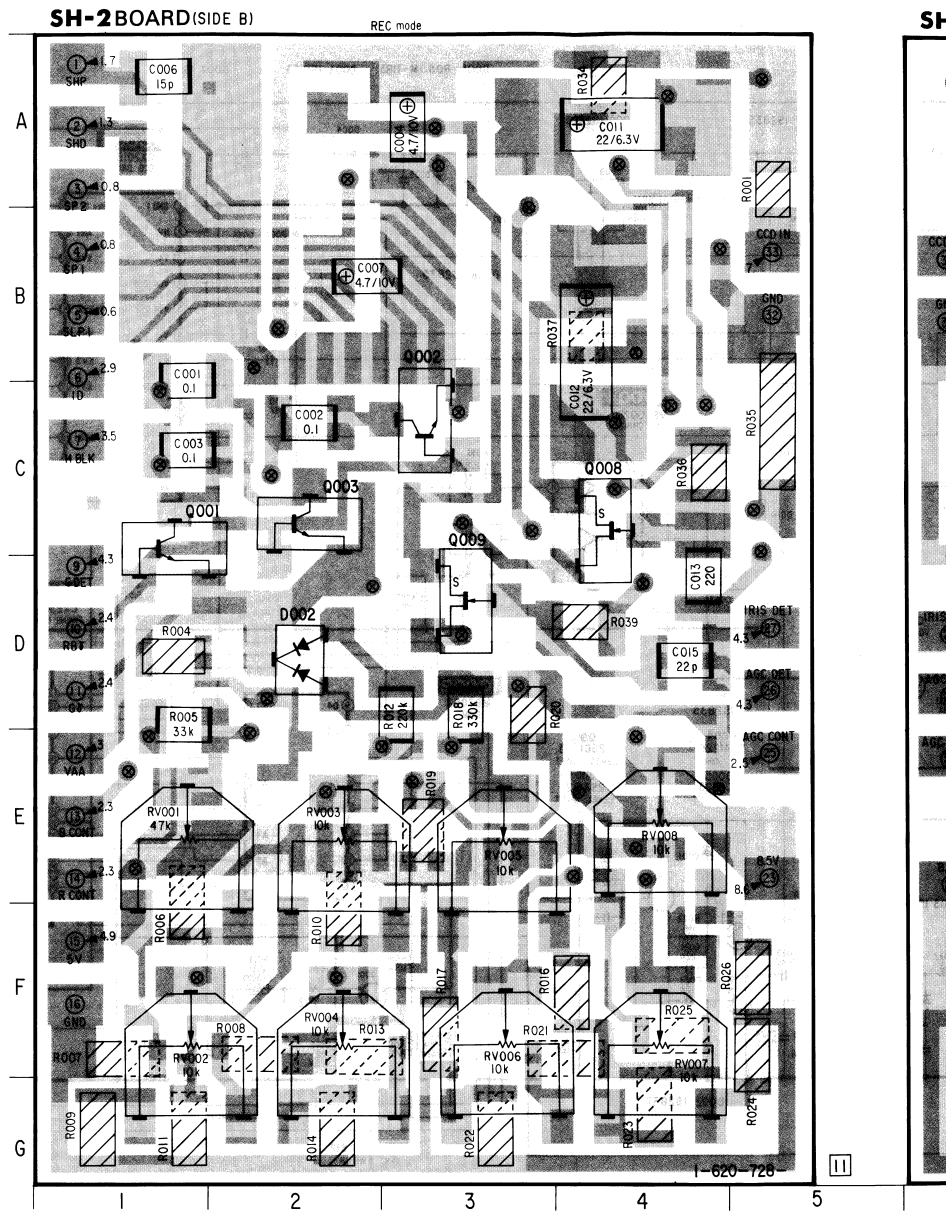


SH-2
(CAMERA Process)

When indicating parts by reference number, please include the board name.

SH-2 (CAMERA PROCESS) PRINTED WIRING BOARD

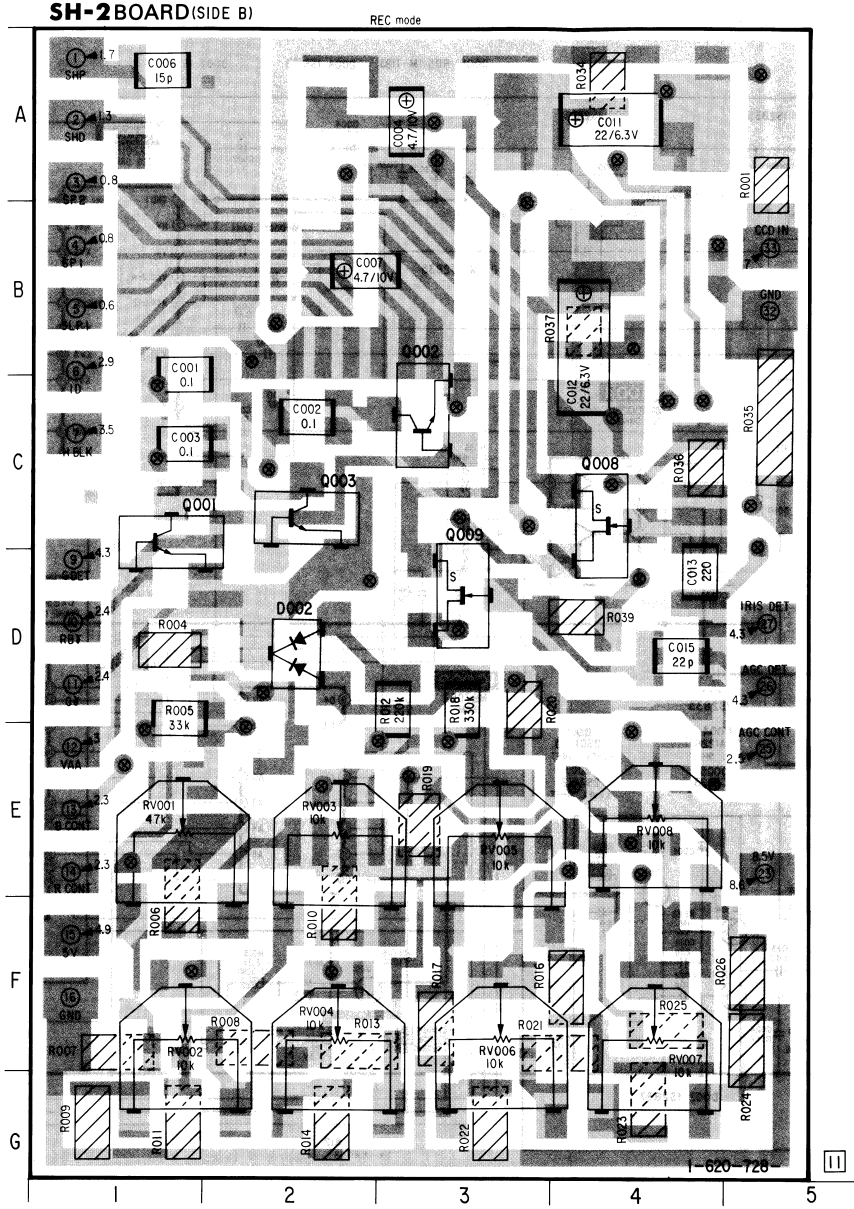
—Ref. No. SH-2 BOARD : 1, 900 series—



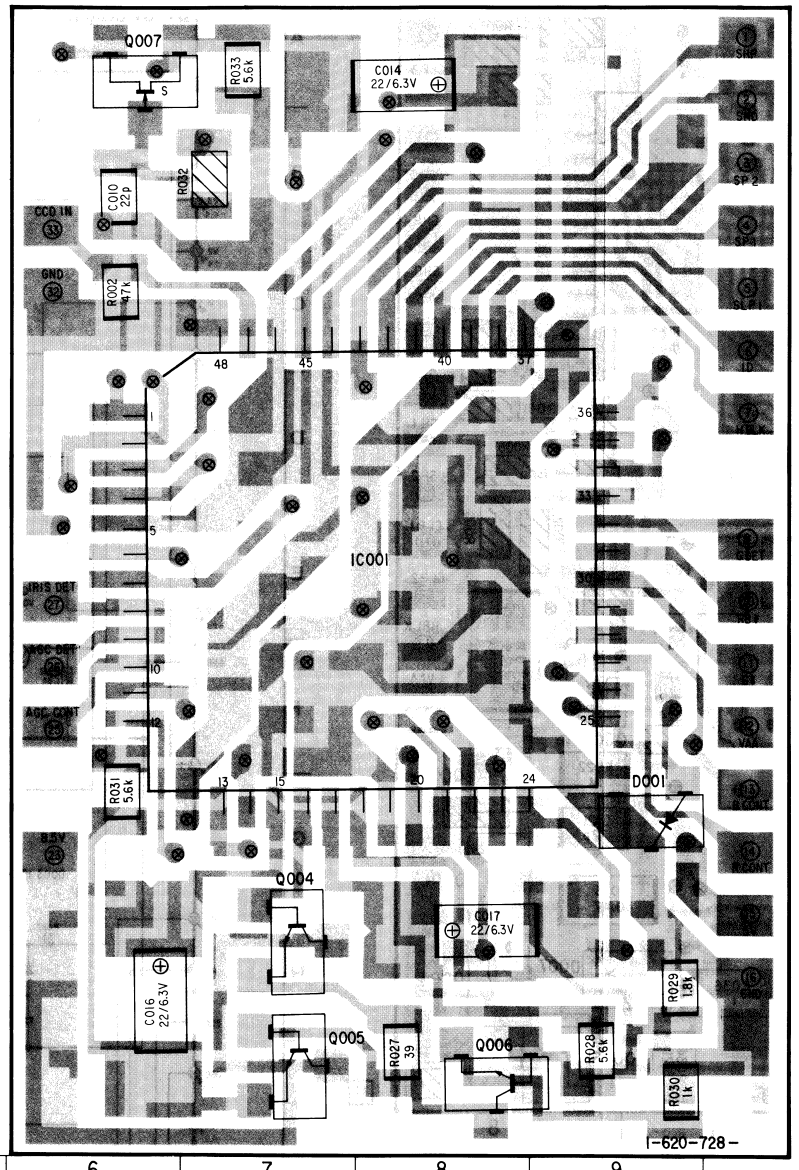
SH-2 (CAMERA PROCESS) PRINTED WIRING BOARD

—Ref. No. SH-2 BOARD : 1, 900 series—

SH-2 BOARD (SIDE B)

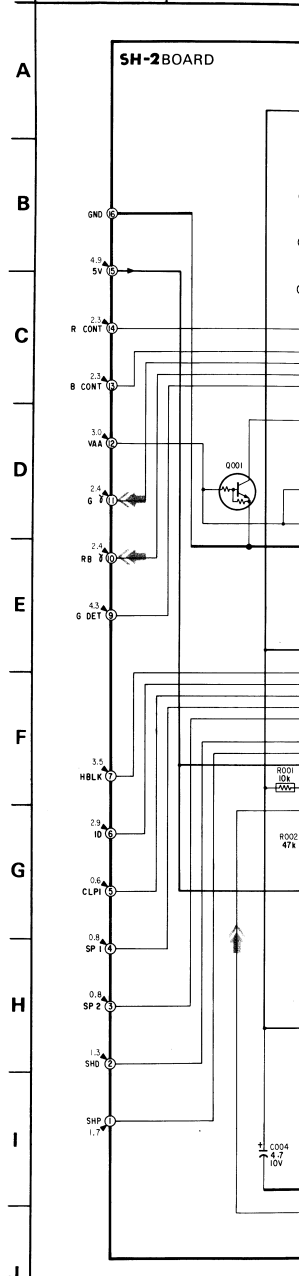


SH-2 BOARD (SIDE A)



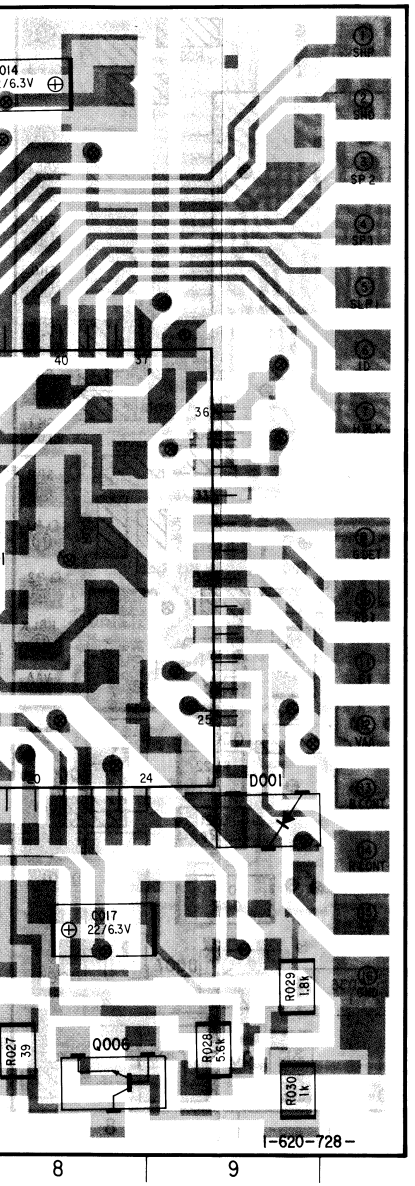
SH-2 (CAMERA PROCESS) SCHE

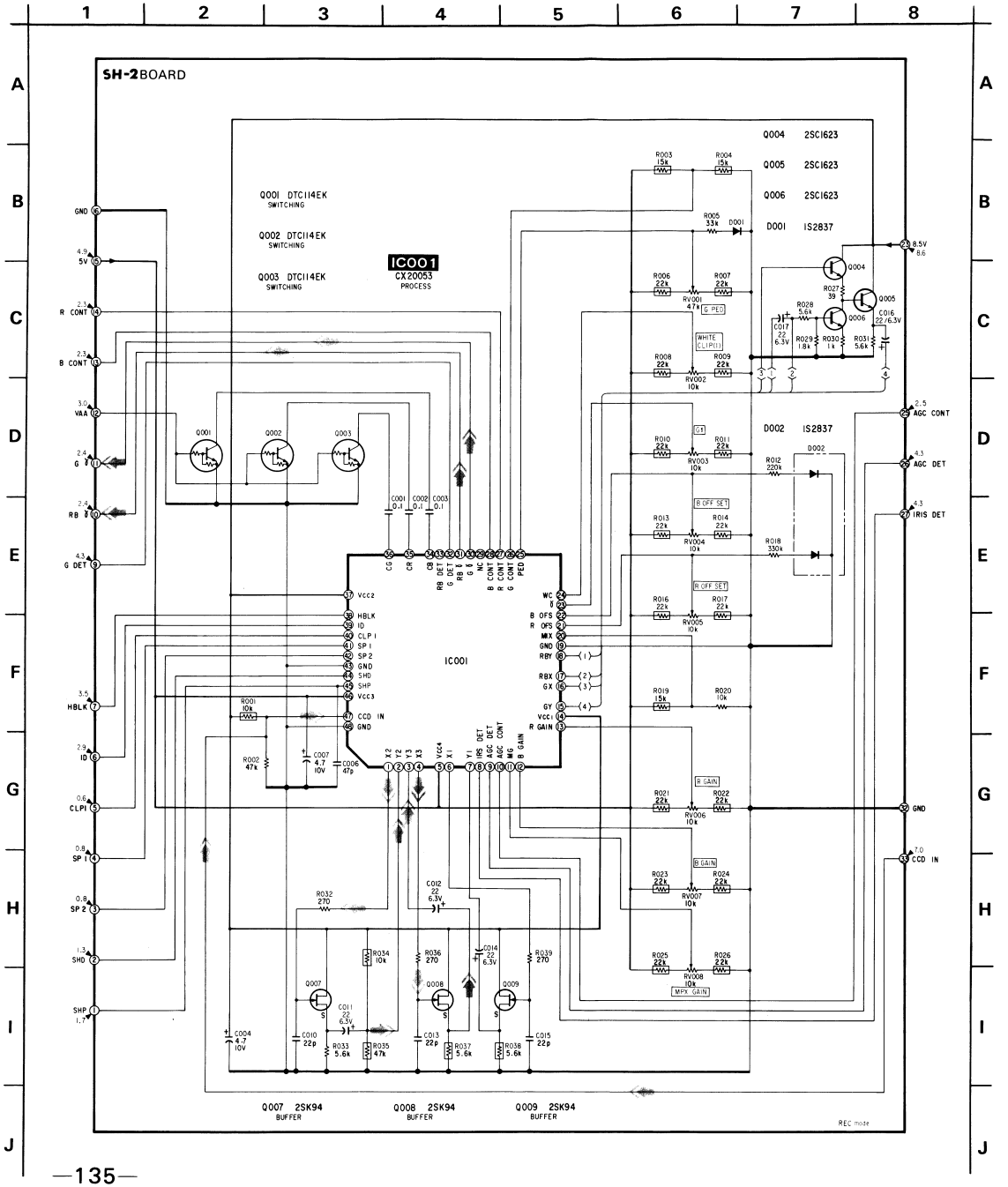
—Ref. No. SH-2 BOARD : 1, 900 seri



SH-2 (CAMERA PROCESS) SCHEMATIC DIAGRAM

—Ref. No. SH-2 BOARD : 1,900 series—

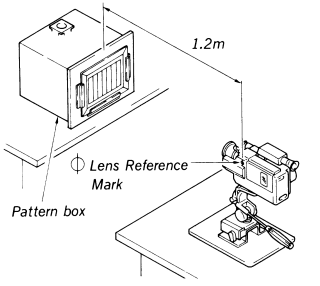




Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ⏦ : printed resistor.
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).
- **Signal path**
  ➡ : REC Y/CHROMA Signal

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

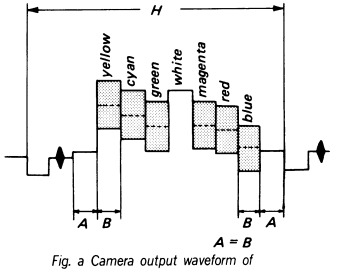


Fig. a Camera output waveform of TP803 on VC-22 board

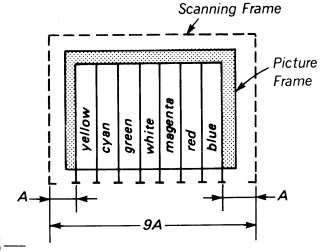
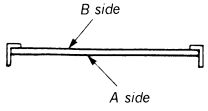


Fig. b Picture of TV monitor screen

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.
- : B+ pattern from the side which enables seeing.
- : Printed resistor.



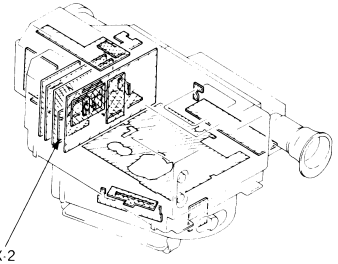
Note

Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.

Component side (SIDE B) : Parts on the component side being seen from the component are stated.

Regarding color indication of patterns

- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.

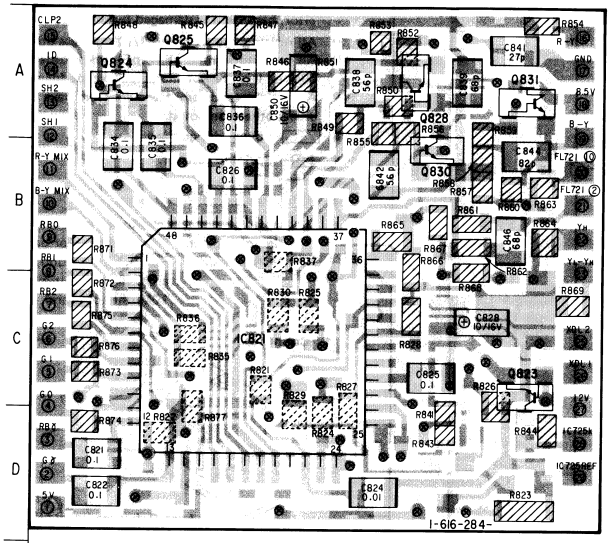


MX-2
(CAMERA Matrix)

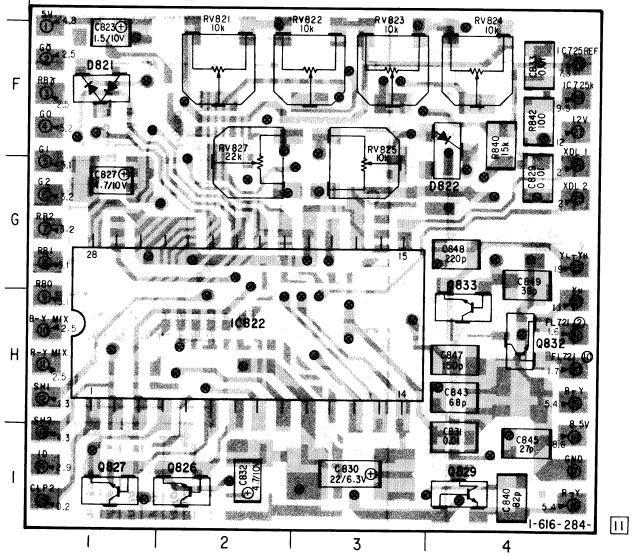
MX-2 (CAMERA MATRIX) PRINTED WIRING BOARD

—Ref. No. MX-2 BOARD : 1,000 series—

MX-2 BOARD(SIDE A)

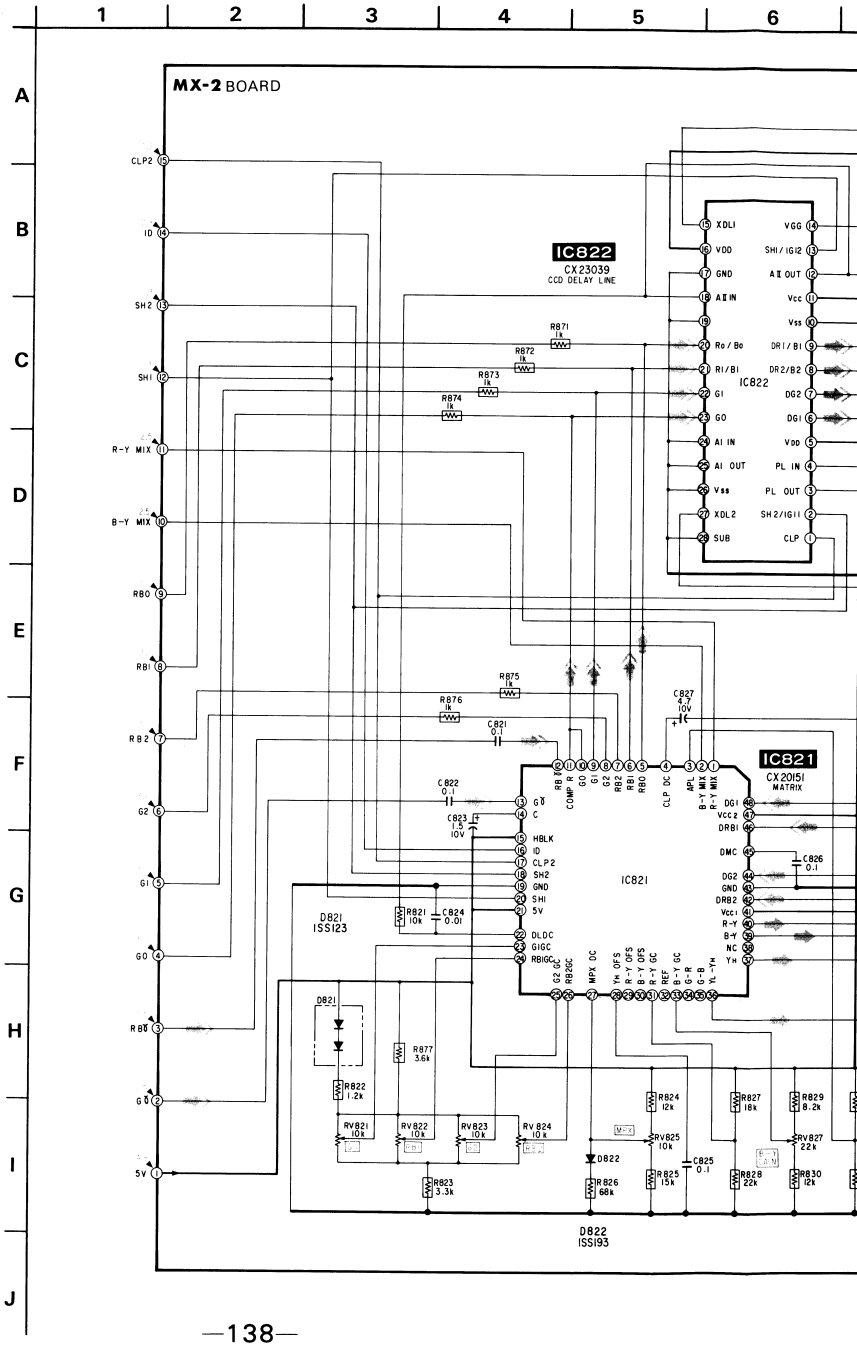


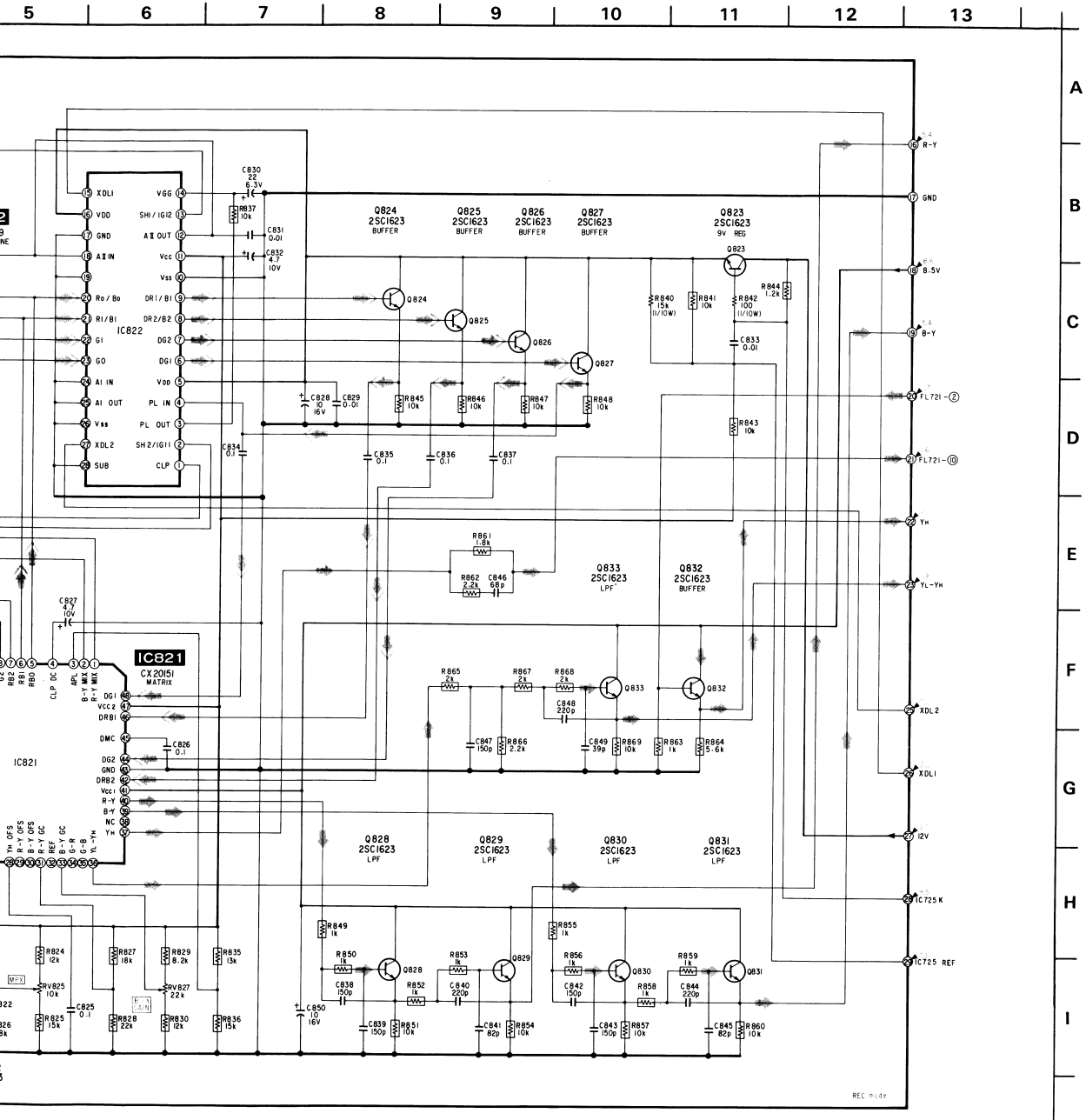
MX-2 BOARD(SIDE B) REC mode



MX-2 (CAMERA MATRIX) SCHEMATIC DIAGRAM

—Ref. No. MX-2 BOARD : 1,000 series—





Note:

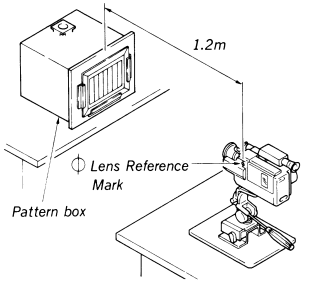
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ⏦ : printed resistor.
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

- **Signal path**
  - ⇨ : REC Y Signal
  - ⇨ : REC Y/CHROMA Signal
  - ⇨ : REC CHROMA Signal

When indicating parts by reference number, please include the board name.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

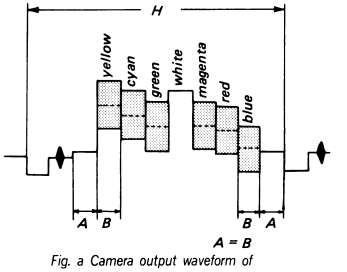


Fig. a Camera output waveform of TP803 on VC-22 board

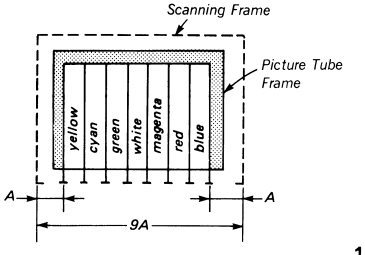


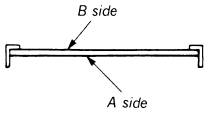
Fig. b Picture of TV monitor screen

IA-1 (IRIS/AGC CONTROL) PRINTED WIRING BOARD

—Ref. No. IA-1 BOARD : 1,000 series—

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▒ : Pattern from the side which enables seeing.
- : Pattern of the rear side.
- : B+ pattern from the side which enables seeing.
- ▨ : Printed resistor.



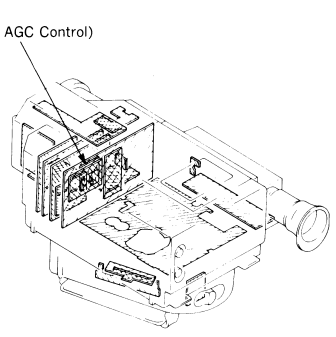
Note

Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.

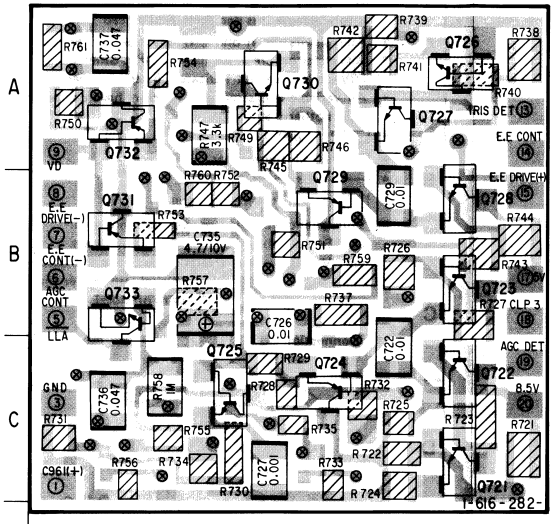
Component side (SIDE B) : Parts on the component side being seen from the component are stated.

Regarding color indication of patterns

- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.

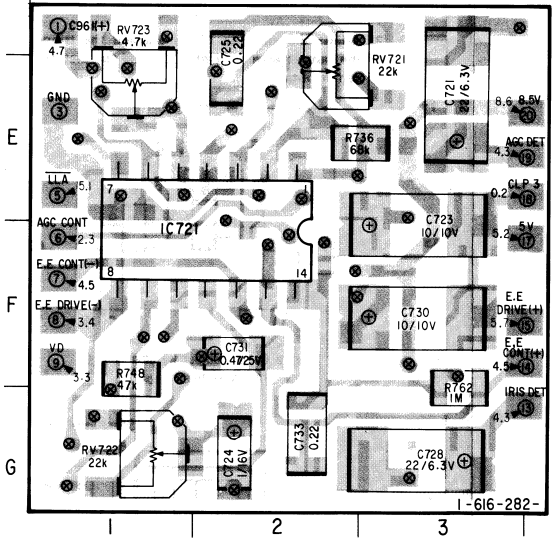


IA-1 BOARD(SIDE A)



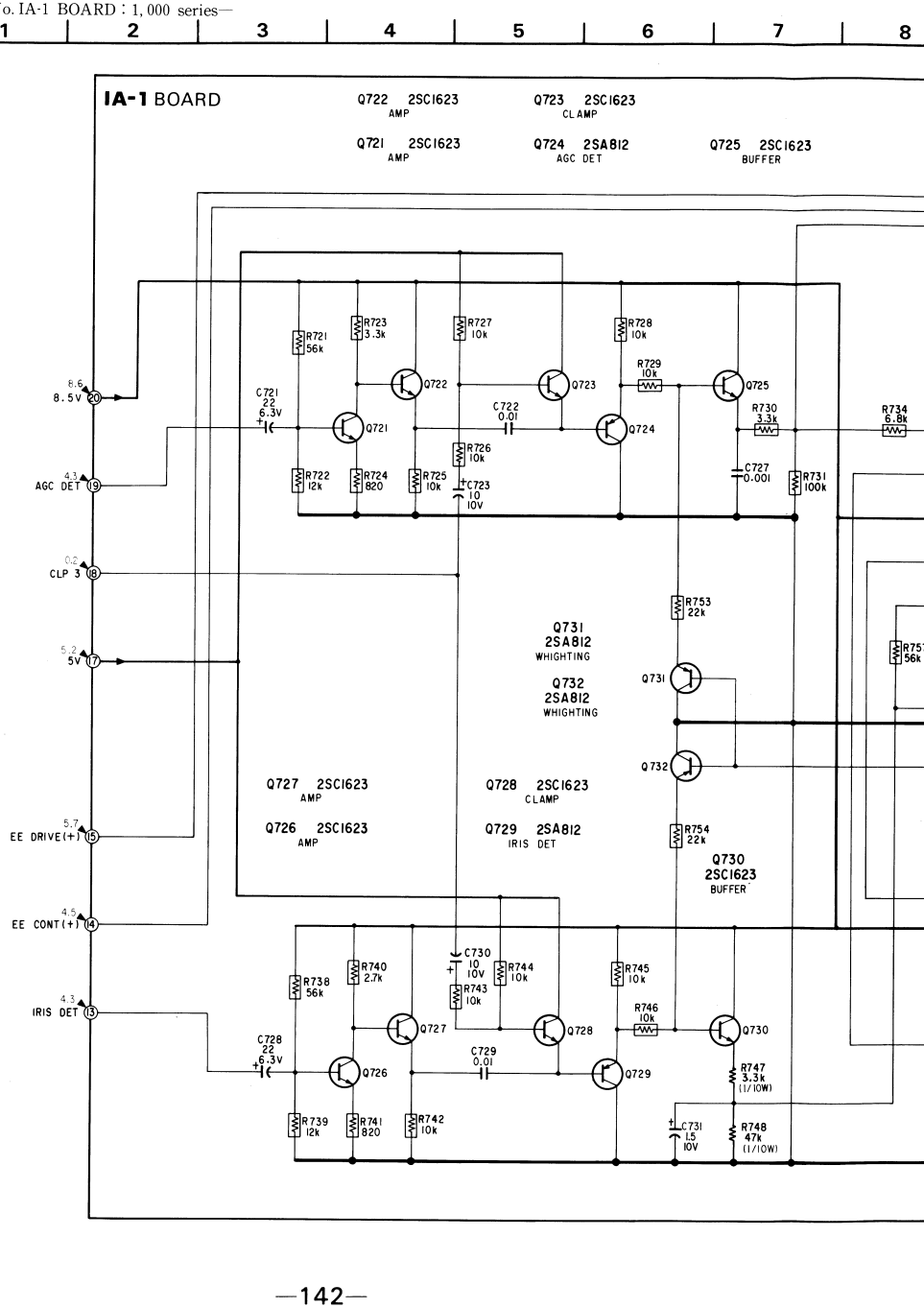
IA-1 BOARD(SIDE B)

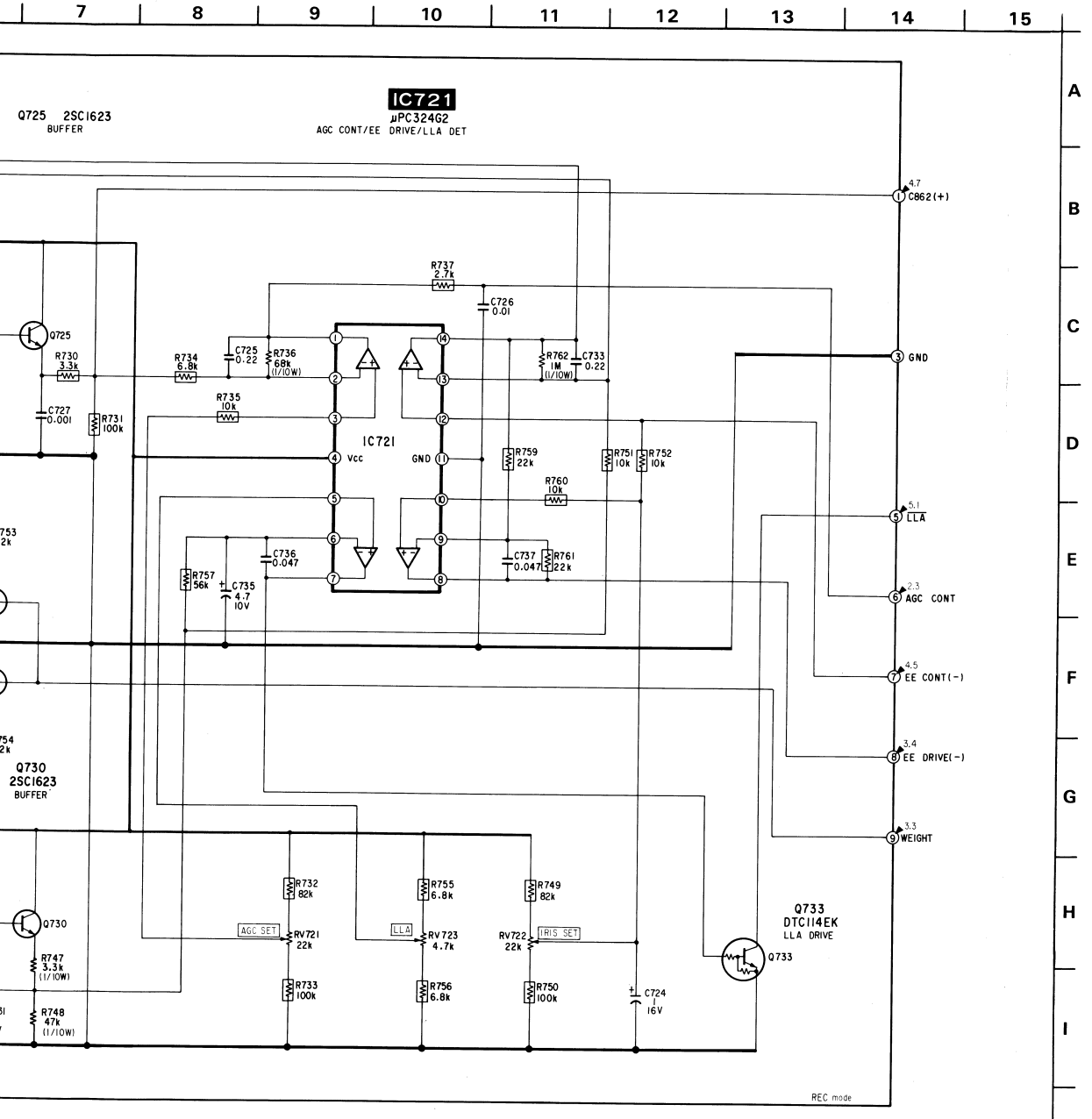
REC mode



IA-1 (IRIS/AGC CONTROL) SCHEMATIC DIAGRAM

—Ref. No. IA-1 BOARD : 1,000 series—



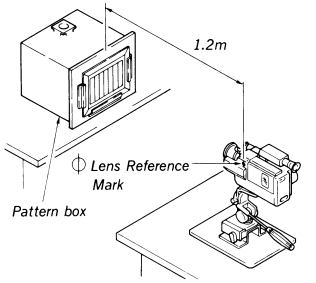


Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ⏦ : printed resistor.
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

When indicating parts by reference number, please include the board name.

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

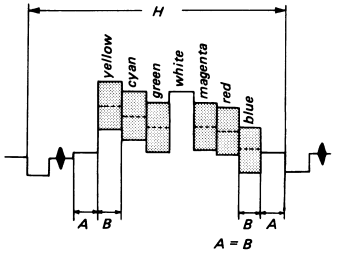


Fig. a Camera output waveform of TP803 on VC-22 board

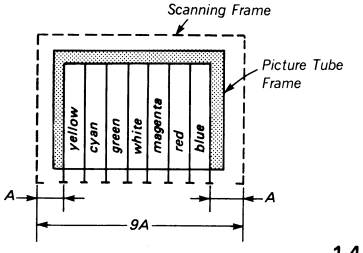


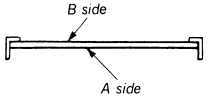
Fig. b Picture of TV monitor screen

RP-34 (REC/PB AMP) PRINTED WIRING BOARD

—Ref. No. RP-34 BOARD : 3,700 series—

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▒ : Pattern from the side which enables seeing.
- Pattern of the rear side.
- : B+ pattern from the side which enables seeing.



Note

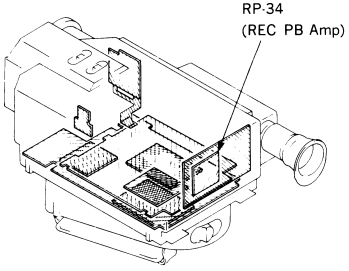
Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.

Component side (SIDE B) : Parts on the component side being seen from the component are stated.

Regarding color indication of patterns

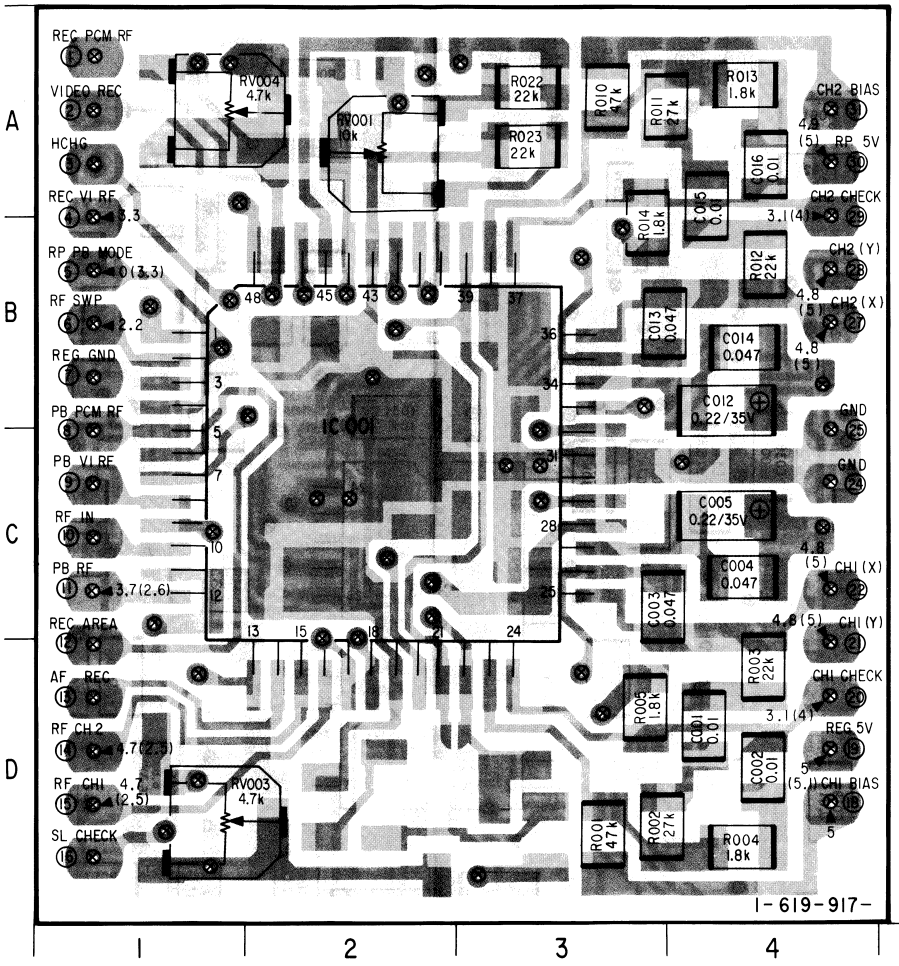
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.

When indicating parts by reference number, please include the board name.

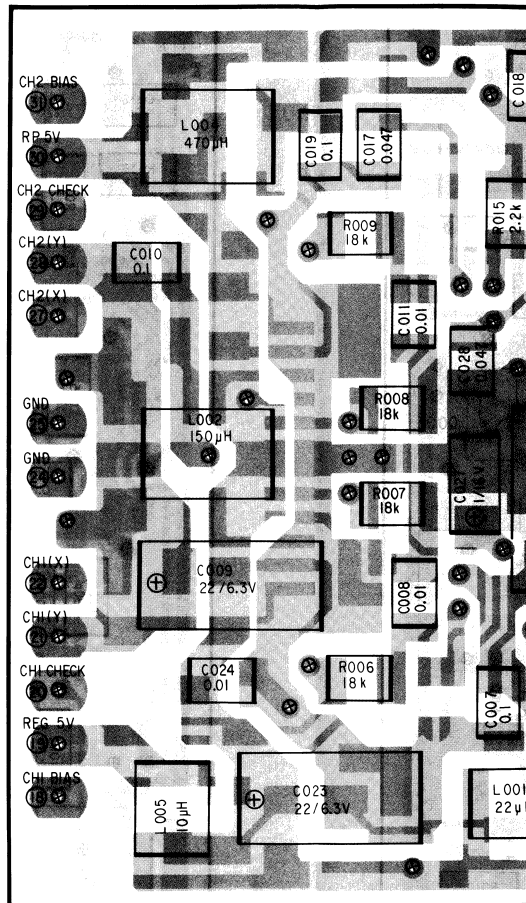


RP-34 BOARD (SIDE B)

no mark : REC mode
( ) : PB mode

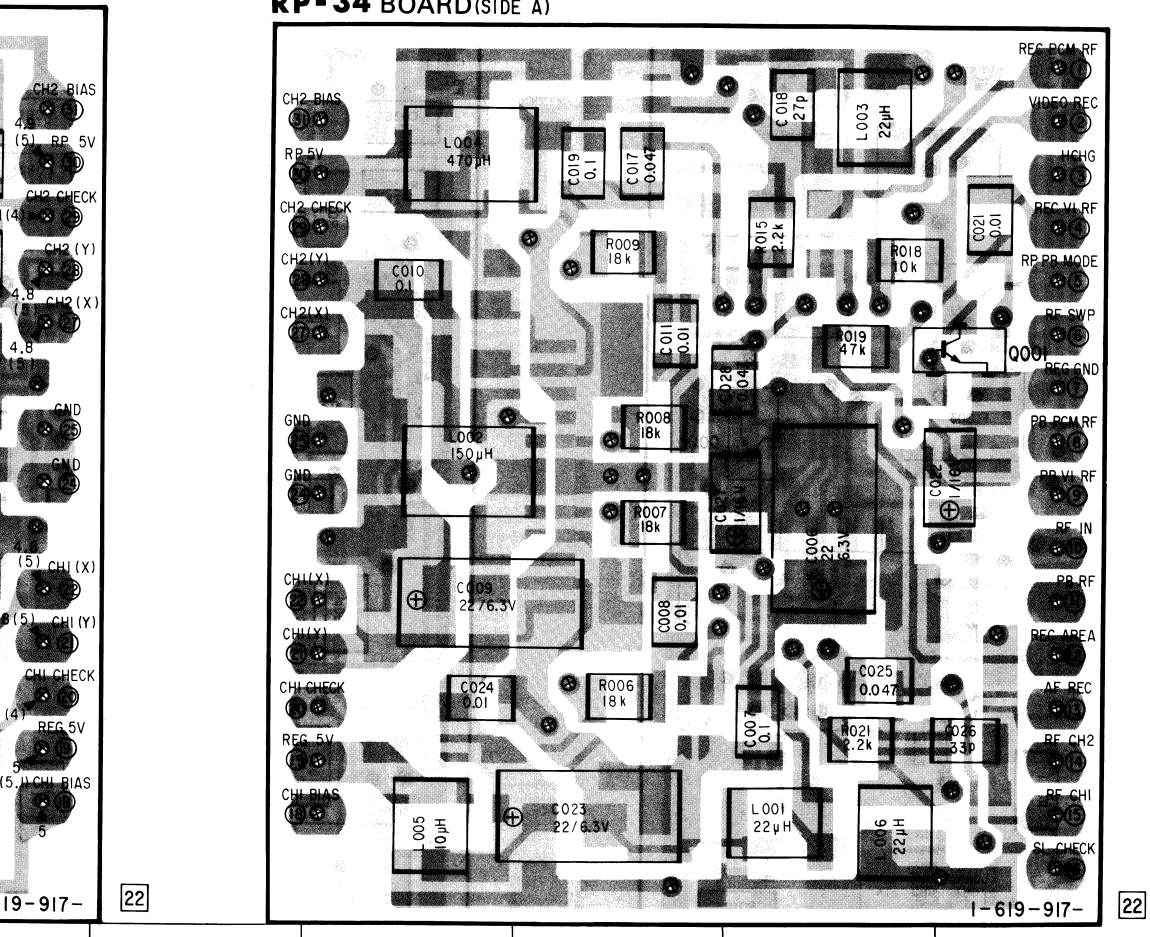


RP-34 BOARD (SIDE A)



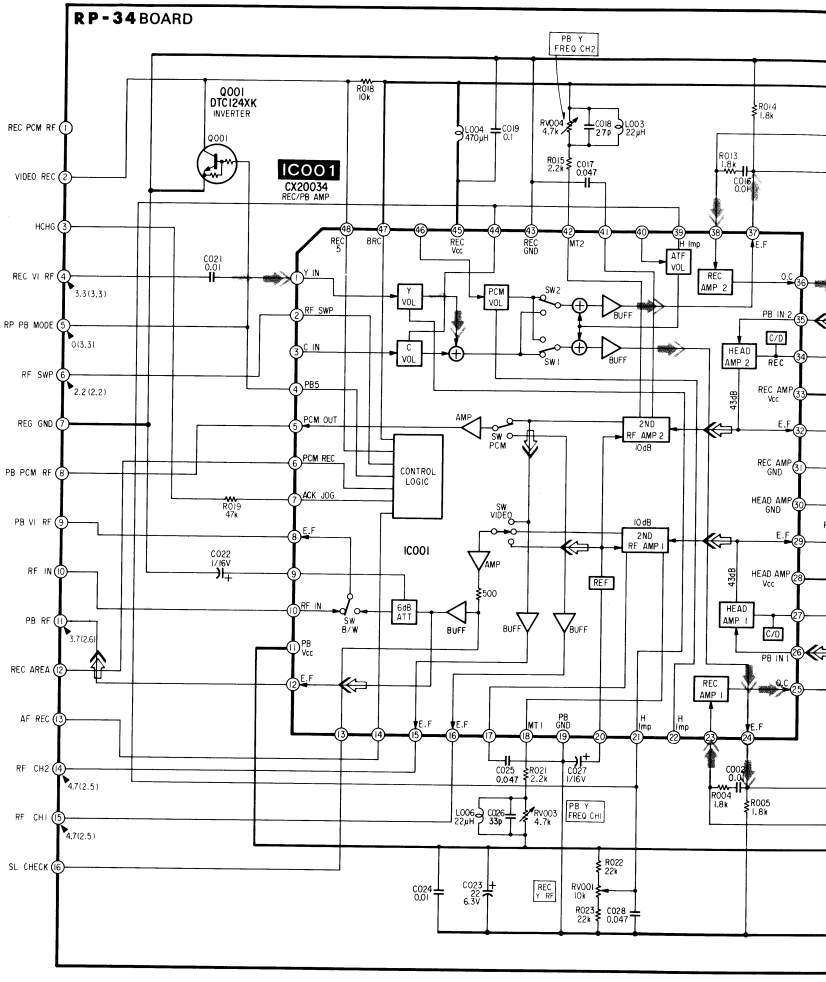
k : REC mode
) : PB mode

RP-34 BOARD (SIDE A)



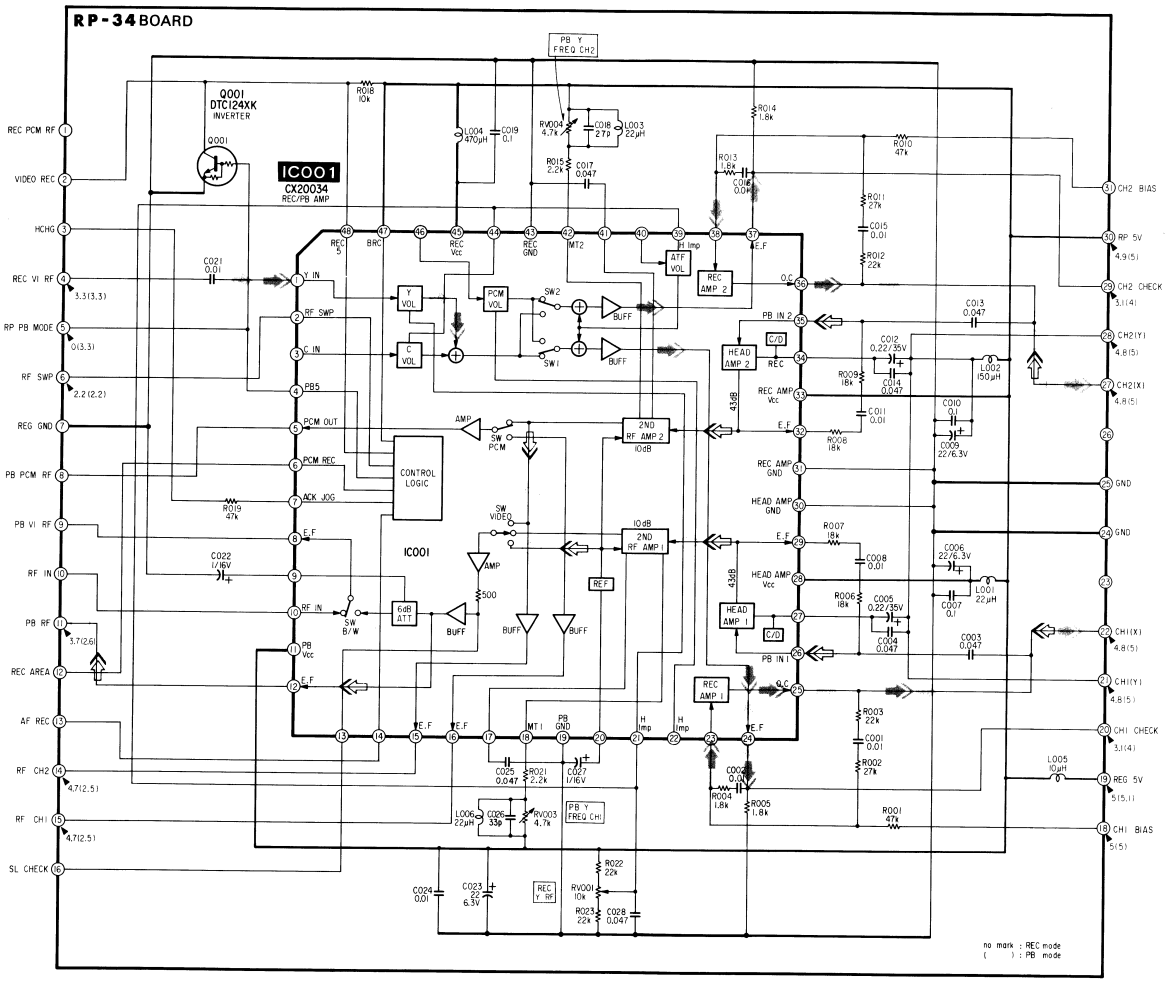
RP-34 (REC/PB AMP) SCHEMATIC DIAGRAM

—Ref. No. RP-34 BOARD : 3, 700 series—



RP-34 (REC/PB AMP) SCHEMATIC DIAGRAM

—Ref. No. RP-34 BOARD : 3, 700 series—

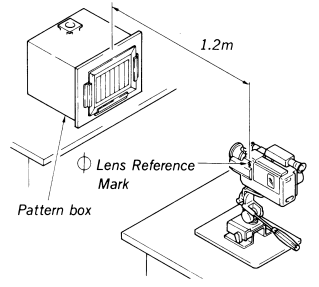


- **Signal path**
  - : REC Y/CHROMA Signal
  - : PB Y/CHROMA Signal

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- : panel designation.
- : Nonflammable resistor
- : B+ bus.
- : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

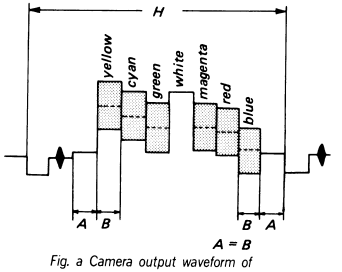


Fig. a Camera output waveform of TP803 on VC-22 board

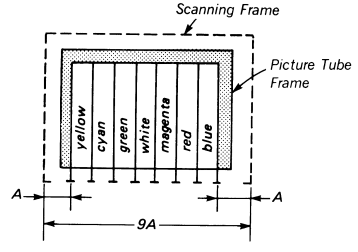
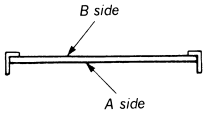


Fig. b Picture of TV monitor screen

Note:

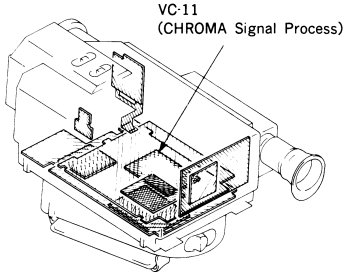
- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- Pattern from the side which enables seeing.
- : Pattern of the rear side.
- : B+ pattern from the side which enables seeing.



Note	
Soldering side (SIDE A)	: Parts on the soldering side being seen from the soldering are stated.
Component side (SIDE B)	: Parts on the component side being seen from the component are stated.

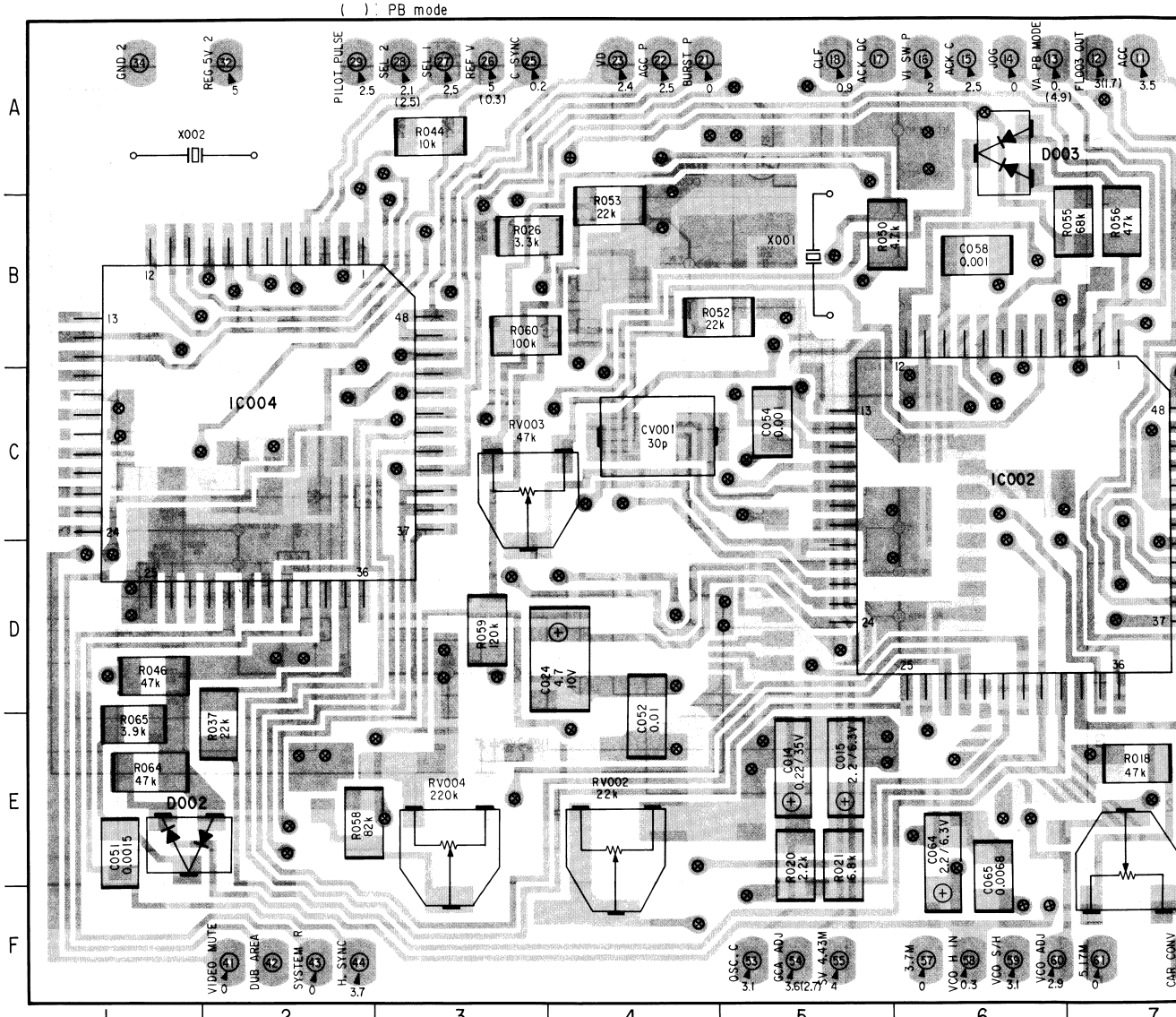
Regarding color indication of patterns

- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.



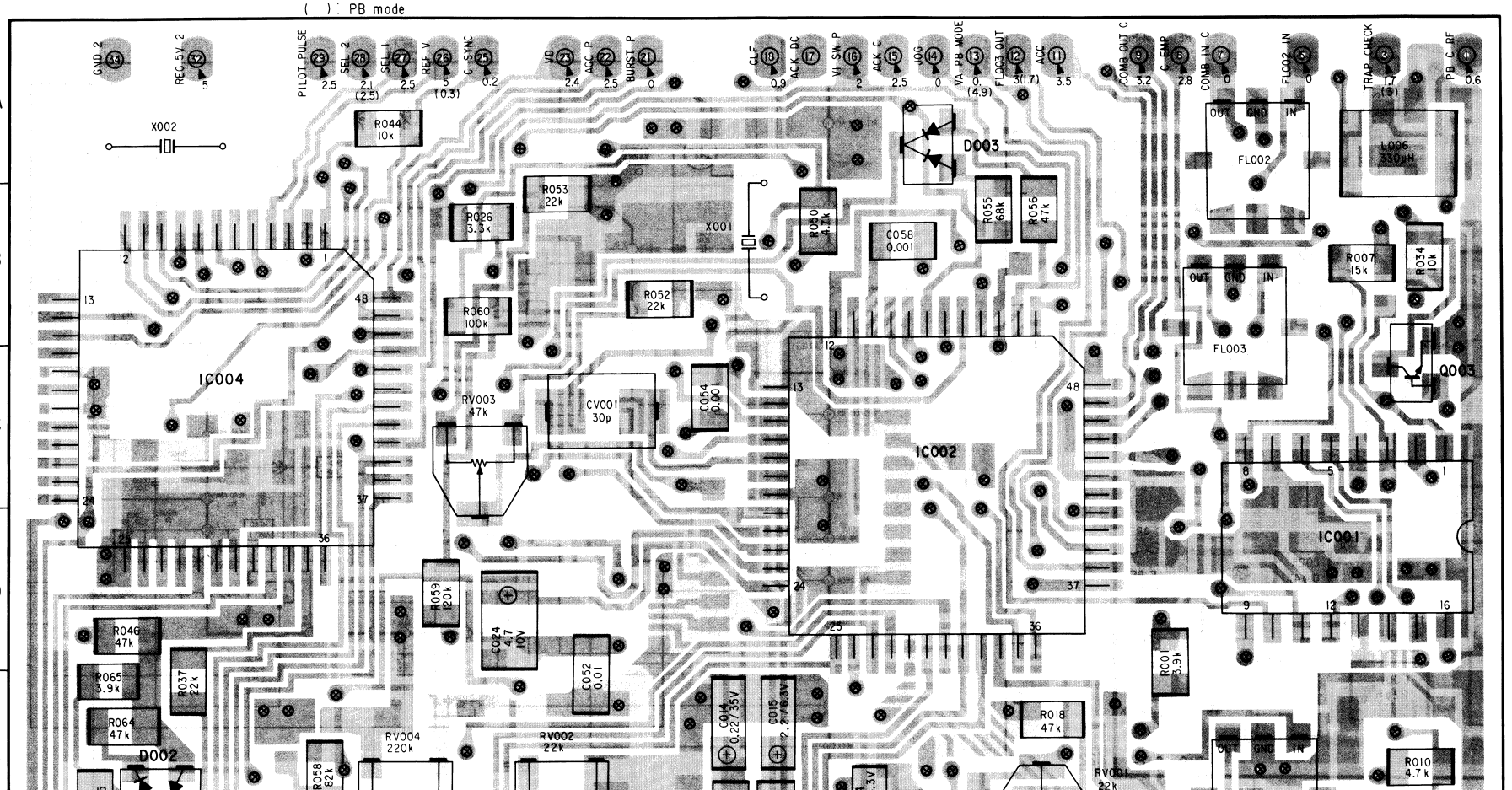
VC-11 (CHROMA SIGNAL PROCESS) PRINTED WIRING BOARD
—Ref. No. VC-11 BOARD : 3,500 series—

VC-11 BOARD (SIDE B) no mark : REC mode ( ) : PB mode

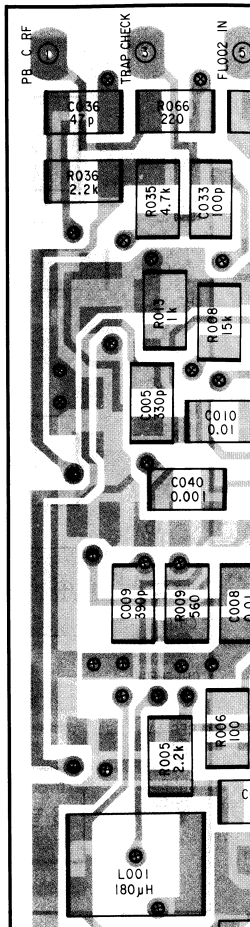


VC-11 BOARD (SIDE B)

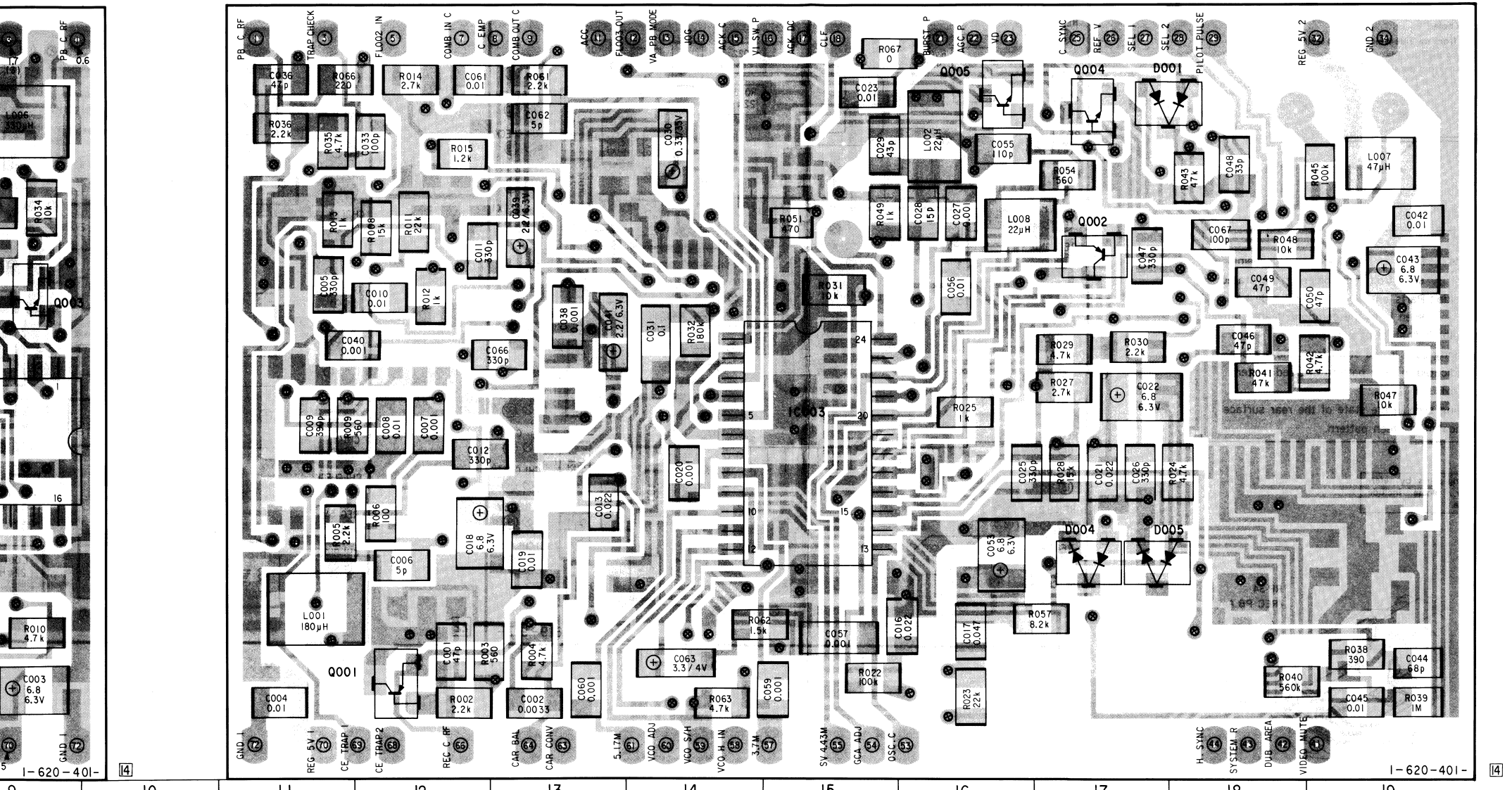
no mark : REC mode
( ) : PB mode



VC-11 BOARD (S



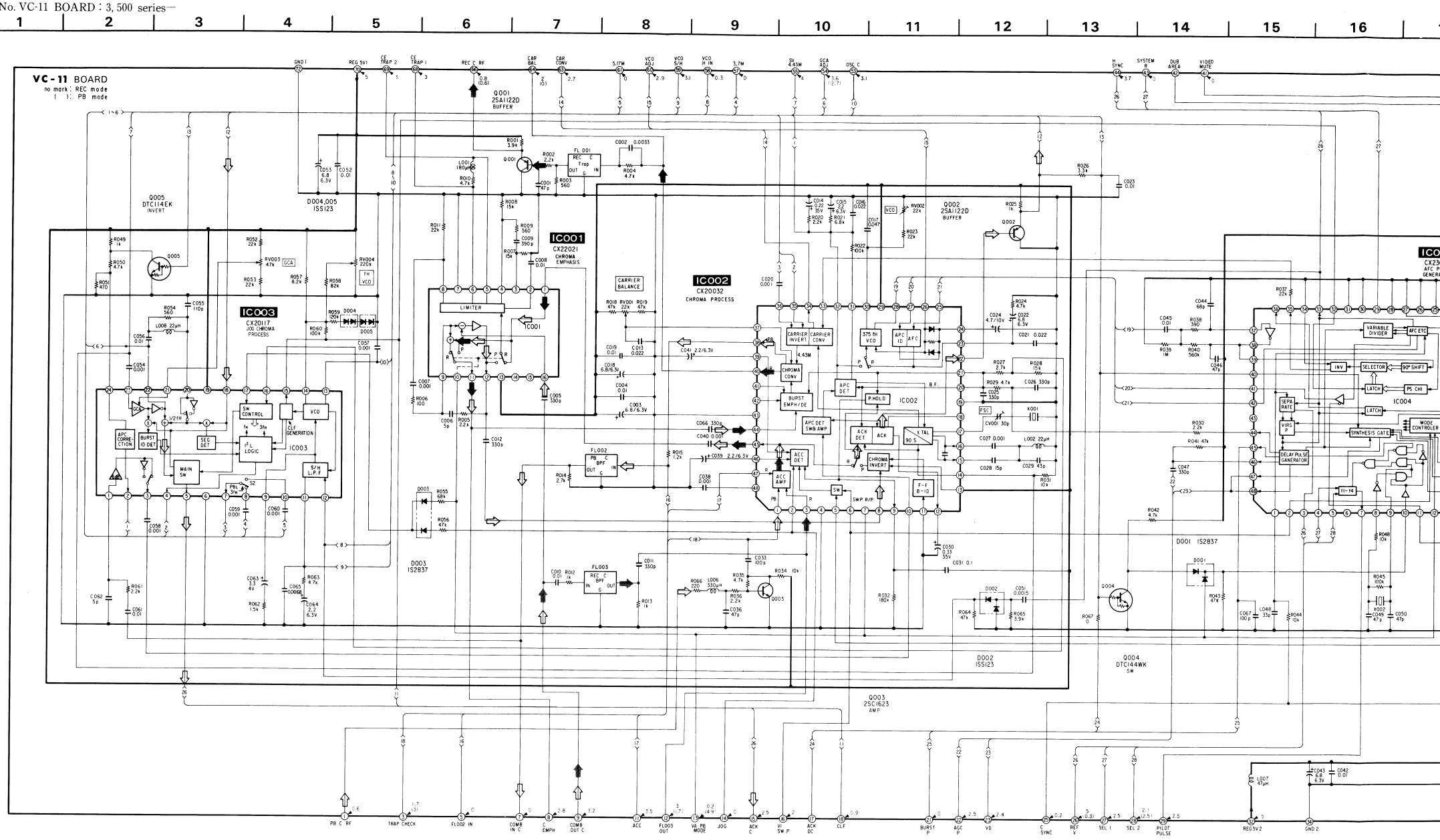
VC-11 BOARD (SIDE A)

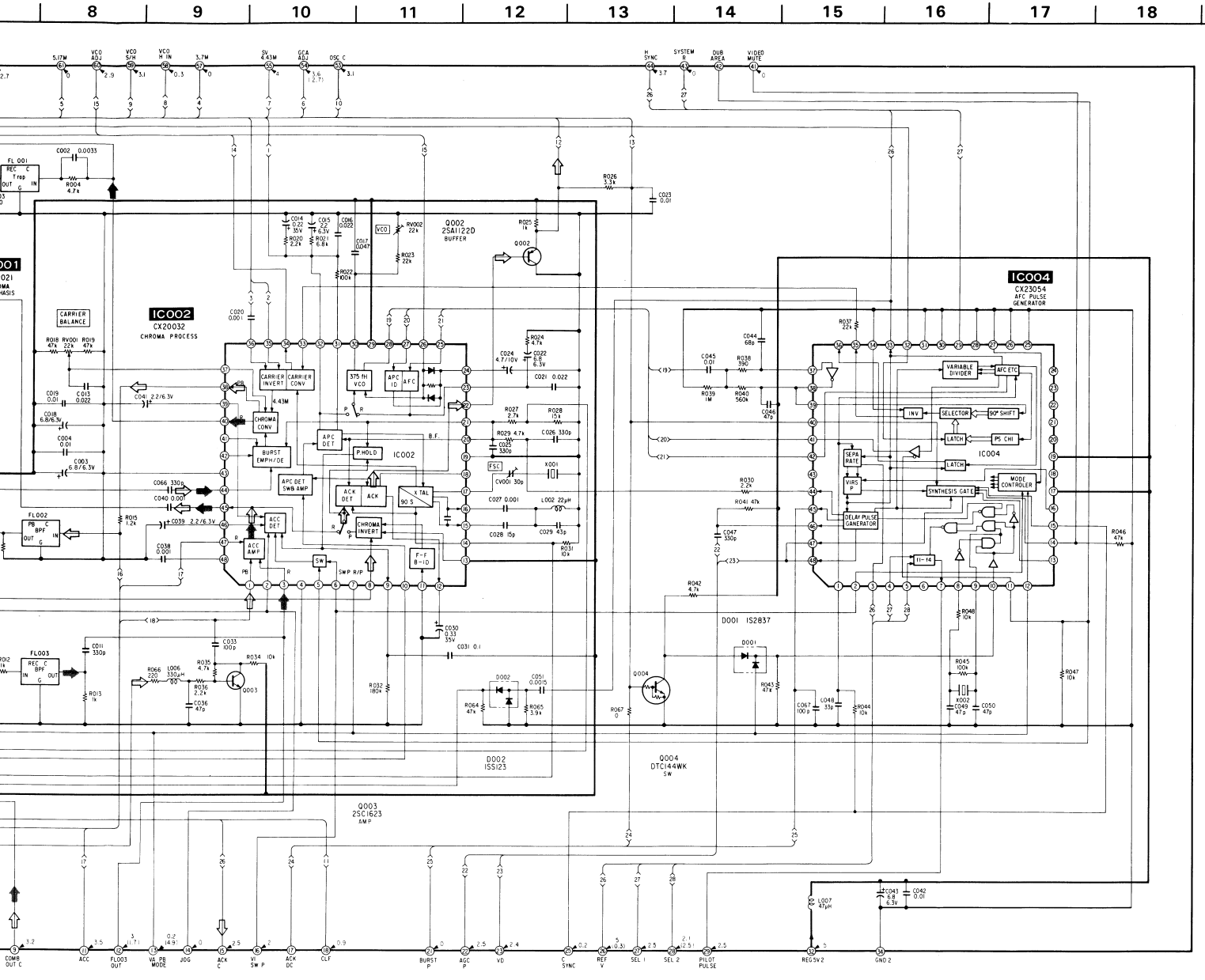


9 10 11 12 13 14 15 16 17 18 19

VC-11 (CHROMA SIGNAL PROCESS) SCHEMATIC DIAGRAM

—Ref. No. VC-11 BOARD : 3, 500 series—



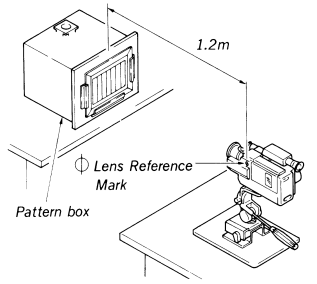


When indicating parts by reference number, please include the board name.

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).
- **Signal path**
  ➡ : REC CHROMA Signal
  ⇨ : PB CHROMA Signal

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

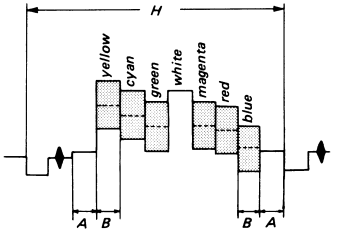


Fig. a Camera output waveform of TP803 on VC-22 board

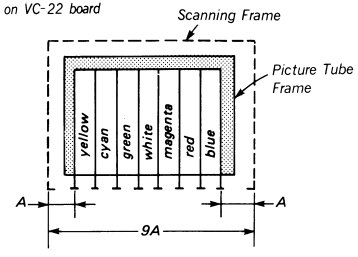


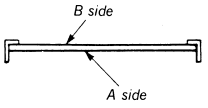
Fig. b Picture of TV monitor screen

VY-9 (Y SIGNAL PROCESS) PRINTED WIRING BOARD

—Ref. No. VY-9 BOARD : 3, 400 series—

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- Pattern of the rear side.
- : B+ pattern from the side which enables seeing.



Note

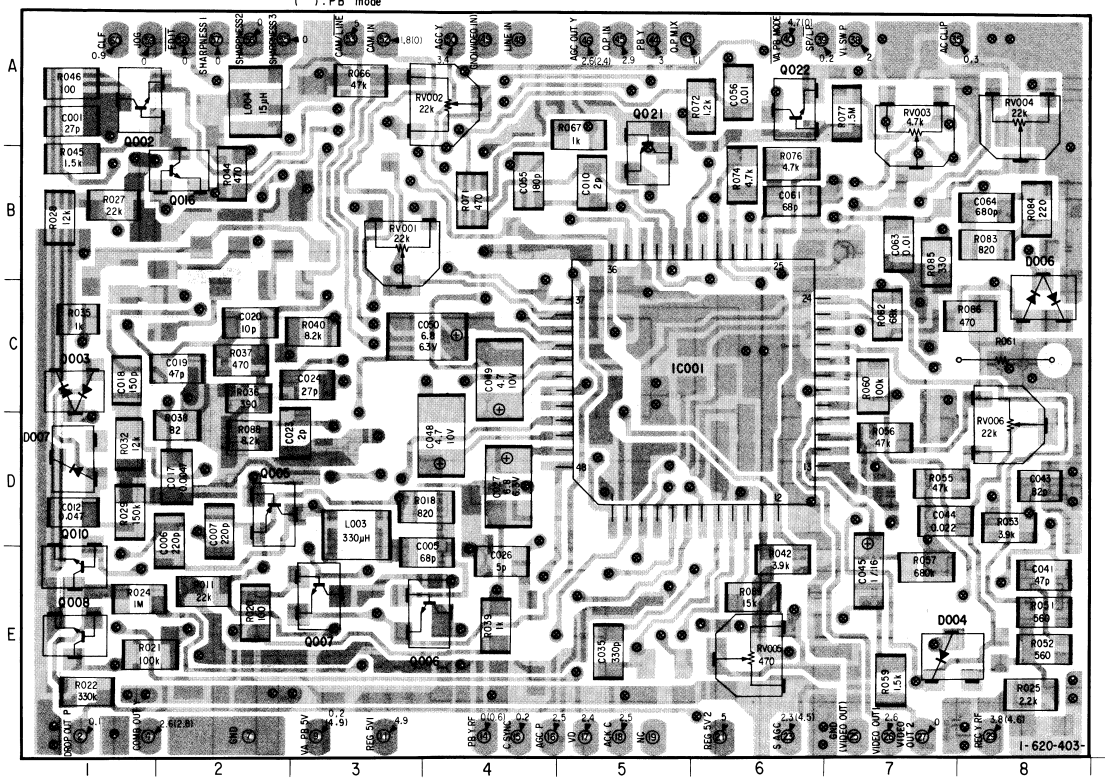
Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.

Component side (SIDE B) : Parts on the component side being seen from the component are stated.

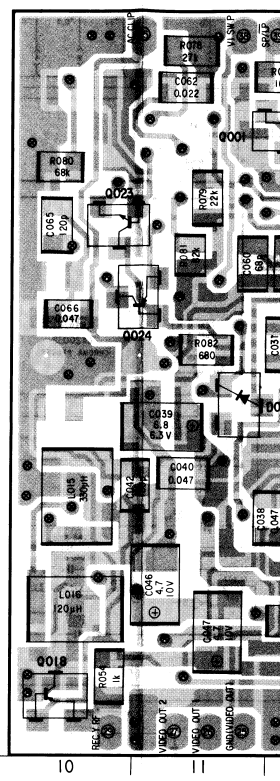
Regarding color indication of patterns

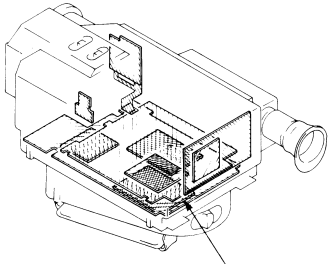
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.

VY-9 BOARD (SIDE B) no mark : REC mode ( ) : PB mode



VY-9 BOARD (SIDE A)



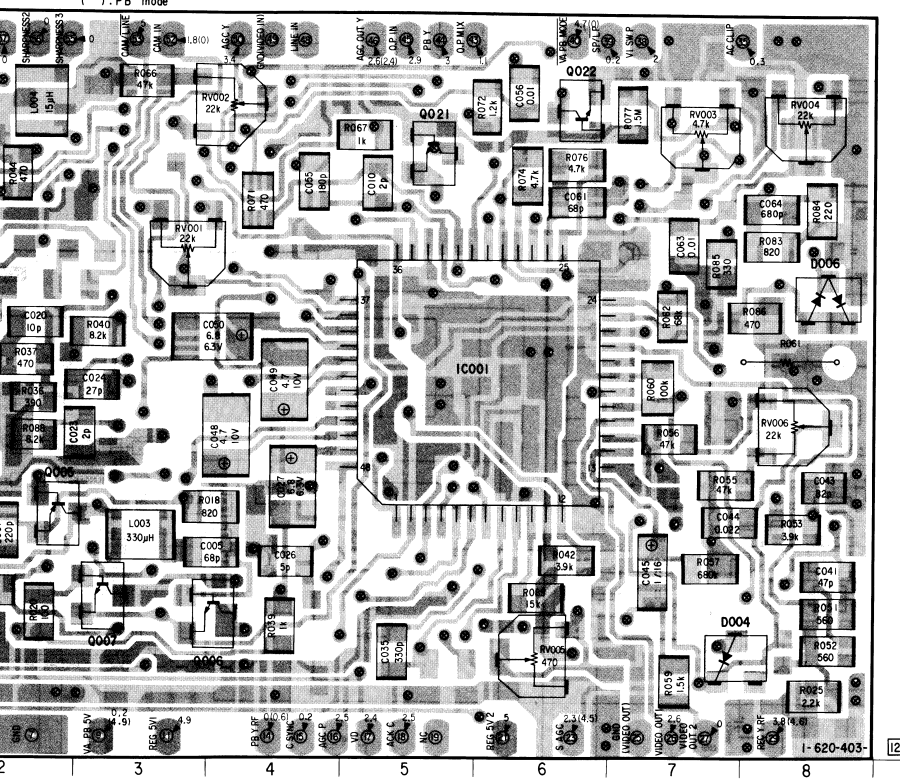


VY-9
(Y Signal Process)

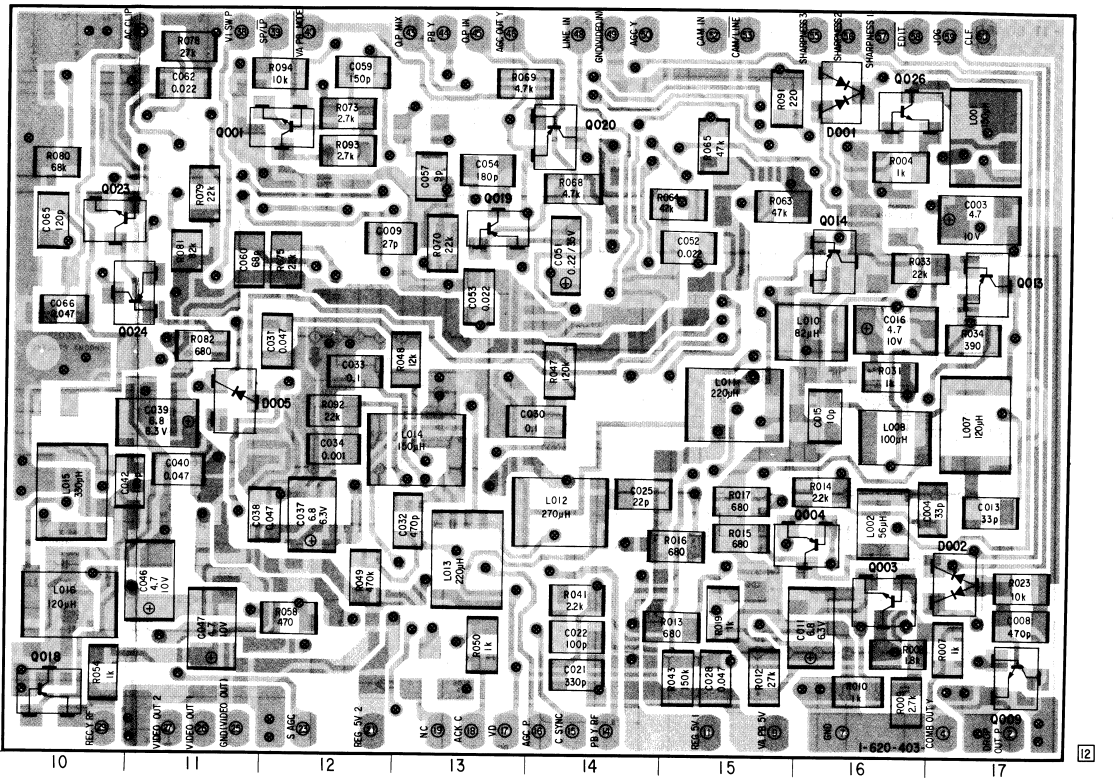
When indicating parts by reference number, please include the board name.

S) PRINTED WIRING BOARD
, 400 series—

3) no mark : REC mode
( ) : PB mode

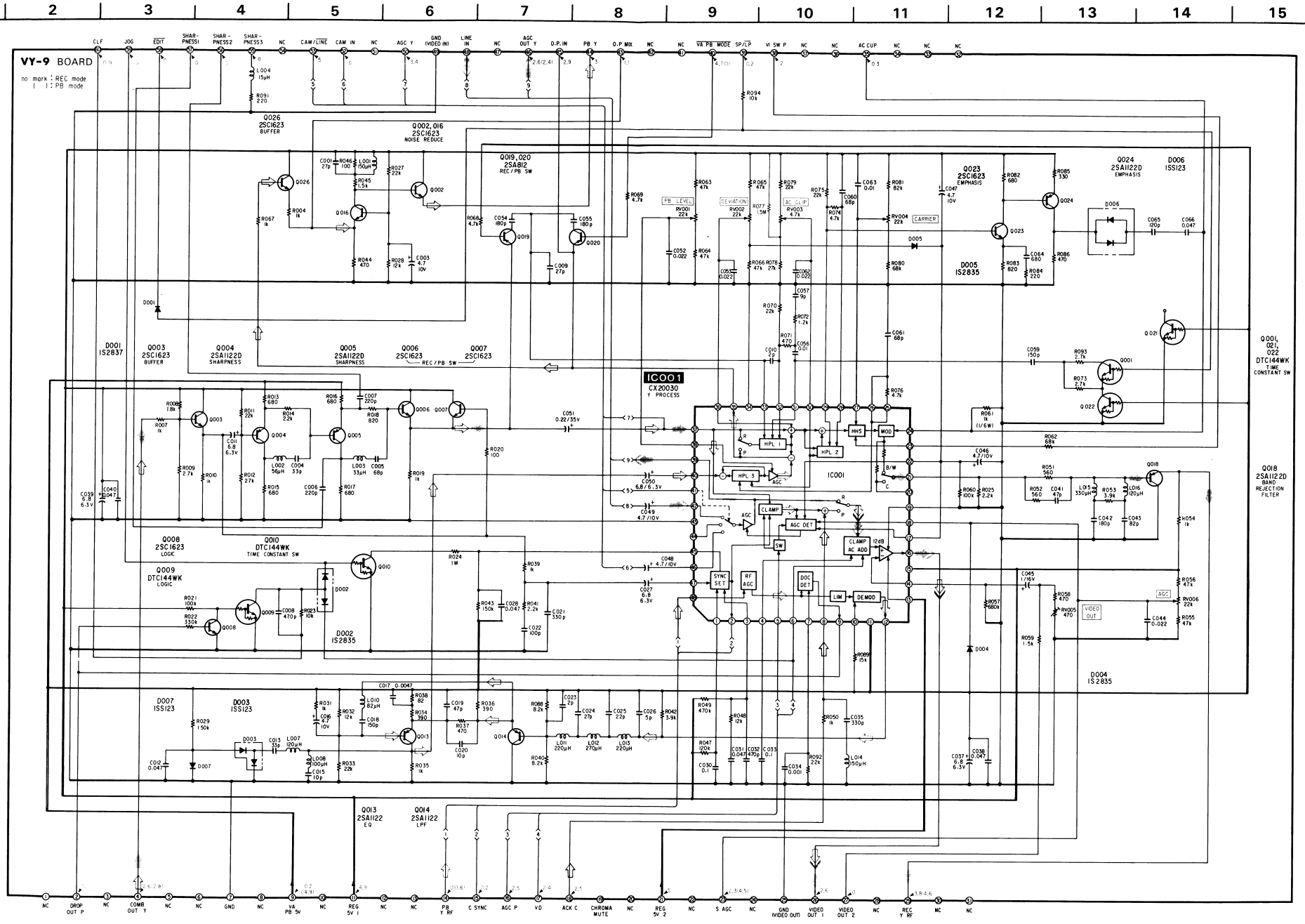


VY-9 BOARD (SIDE A)



VY-9 (Y SIGNAL PROCESS) SCHEMATIC DIAGRAM

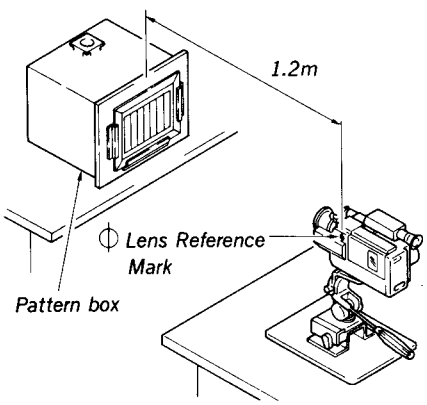
—Ref. No. VY-9 BOARD : 3, 400 series—



Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

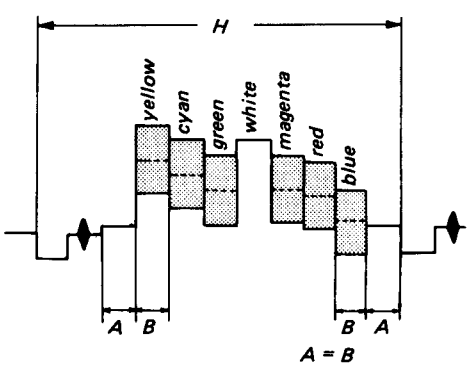


Fig. a Camera output waveform of TP803 on VC-22 board

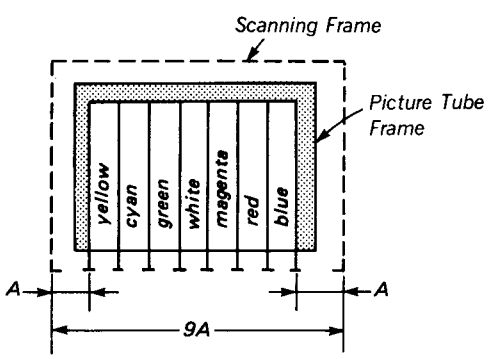


Fig. b Picture of TV monitor screen

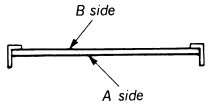
- **Signal path**
  - : REC Y Signal
  - ⇨ : PB Y Signal
  - ⇨ : PB CHROMA Signal
  - : REC Y/CHROMA Signal
  - ⇨ : PB Y/CHROMA Signal

VD-6 (COMB FILTER) PRINTED WIRING BOARD

—Ref. No. VD-6 BOARD : 3, 600 series—

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▩ : Pattern from the side which enables seeing.
- ▩ : Pattern of the rear side.
- ▩ : B+ pattern from the side which enables seeing.



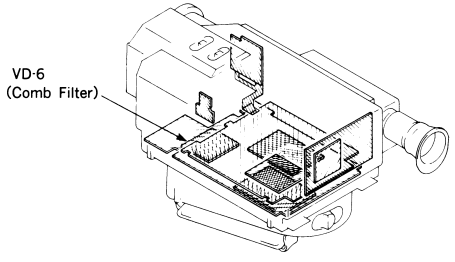
Note

Soldering side : Parts on the soldering side being
(SIDE A) seen from the soldering are stated.

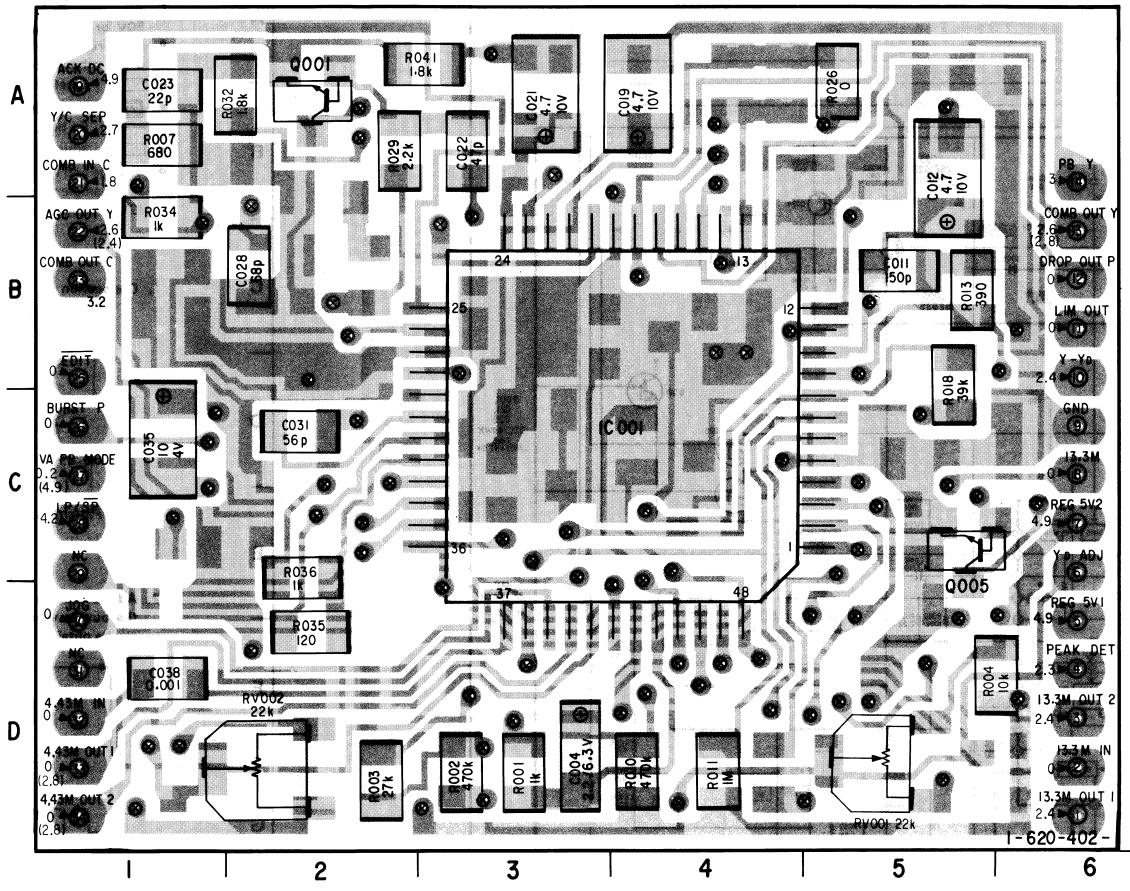
Component side : Parts on the component side being
(SIDE B) seen from the component are stated.

Regarding color indication of patterns

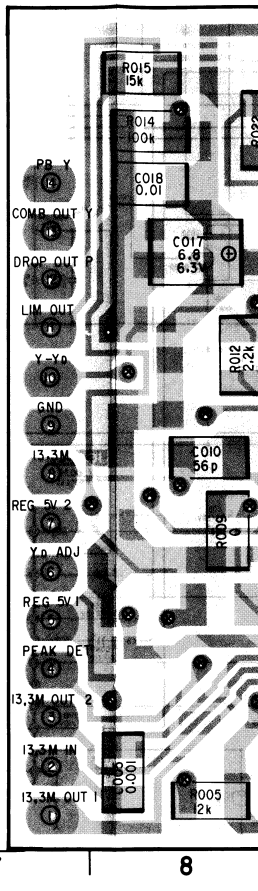
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.



VD-6 BOARD (SIDE B) no mark : REC mode ( ) : PB mode



VD-6 BOARD (SIDE

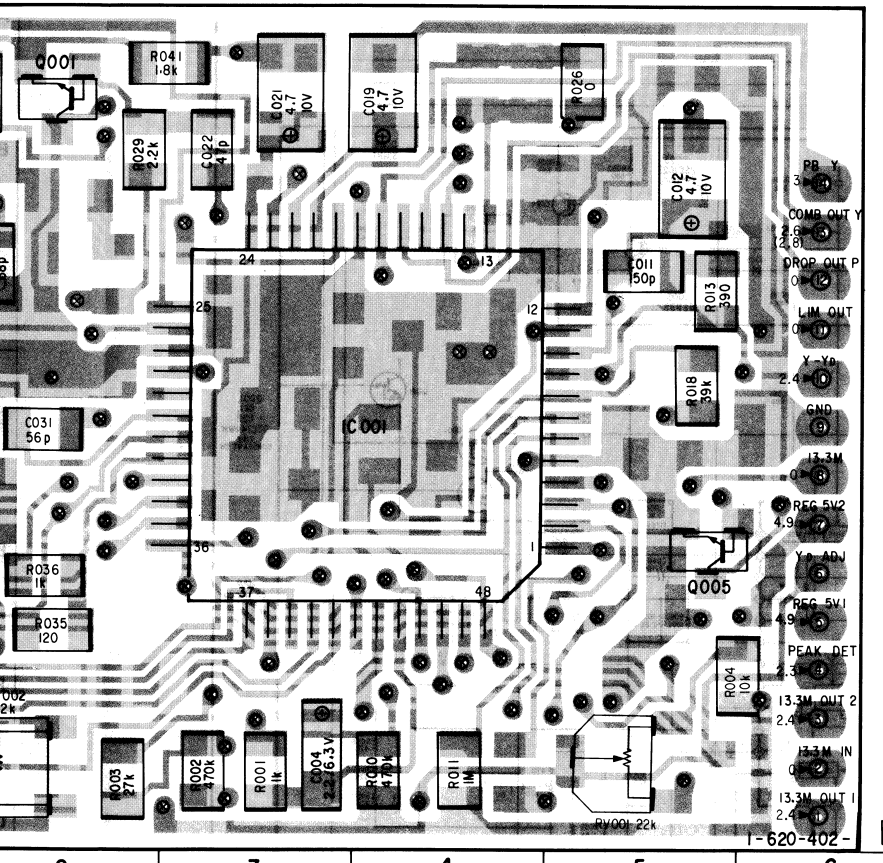


When indicating parts by reference number, please include the board name.

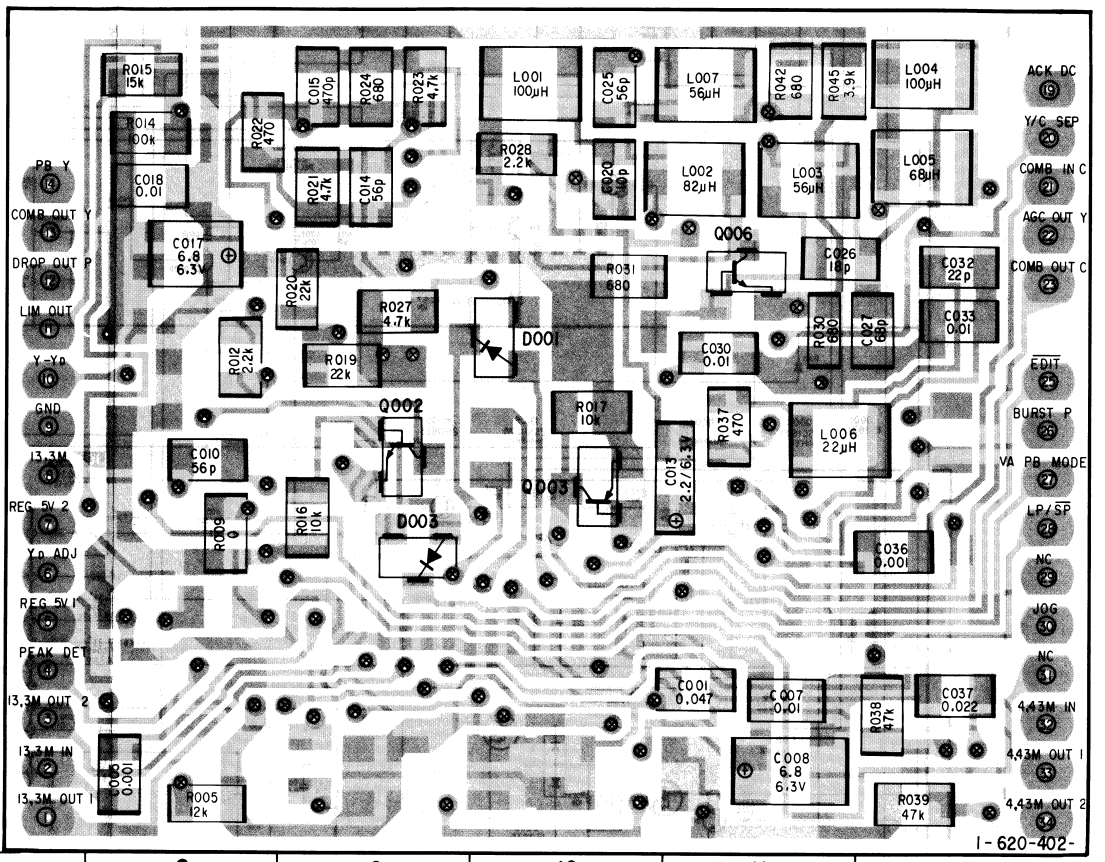
O WIRING BOARD
series—

no mark : REC mode
( ) : PB mode

SIDE B)



VD-6 BOARD (SIDE A)

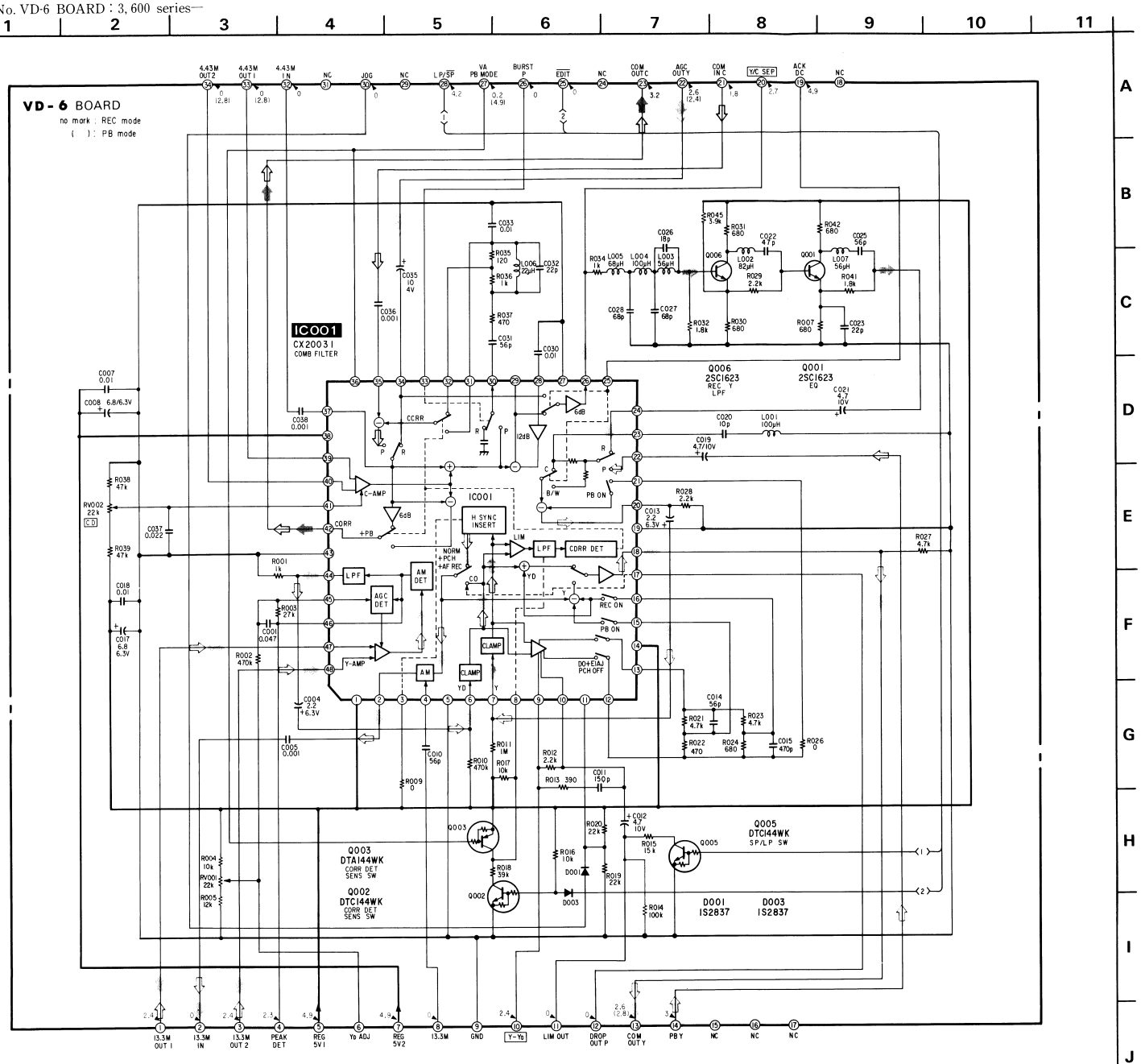


2 3 4 5 6 7 8 9 10 11 12

by refer-
include

VD-6 (COMB FILTER) SCHEMATIC DIAGRAM

—Ref. No. VD-6 BOARD : 3,600 series—

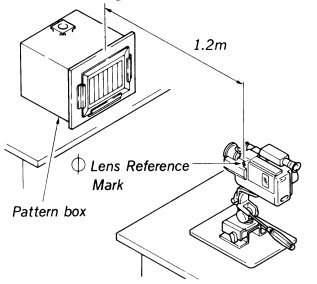


—167—

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box color bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).
- **Signal path**
  - REC Y Signal
  - PB Y Signal
  - : REC CHROMA Signal
  - : PB CHROMA Signal
  - REC Y/CHROMA Signal

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

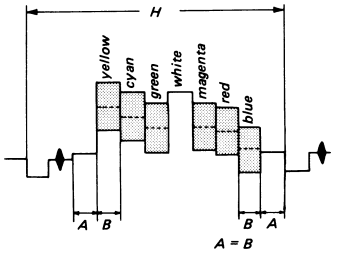


Fig. a Camera output waveform of TP803 on VC-22 board

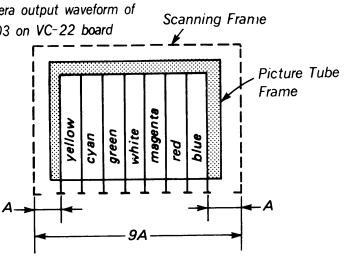
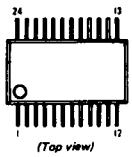


Fig. b Picture of TV monitor screen

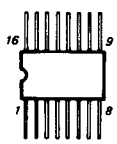
—168—

4-3. SEMICONDUCTOR

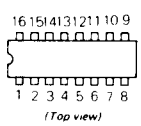
AN2510S



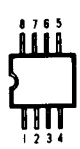
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CX20115A
CX22021
TA7733F
TC4526BF



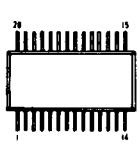
CXA1042M



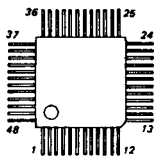
CXB0026M
MMH0026D
TL062CPS
μPC393G2



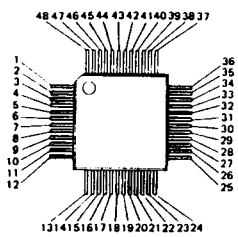
CXD1030M



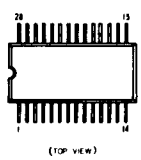
CX20030
CX20031
CX20034
CX20037-A
CX20053
CX20054
CX20055



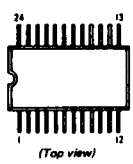
CX20032
CX20151
CX23047B
CX23054



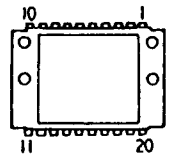
CX20035
CX20036
CX23039



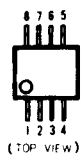
CX20114
CX20117
CX20180



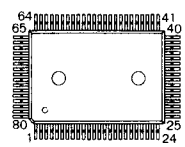
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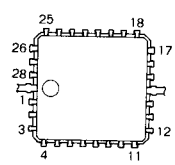
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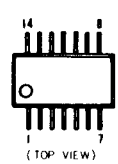
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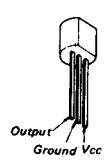
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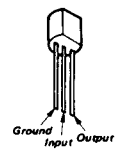
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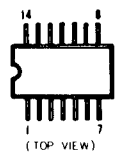
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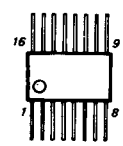
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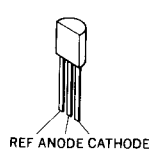
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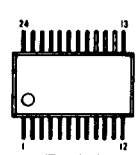
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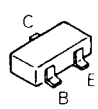
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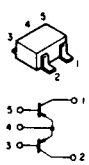
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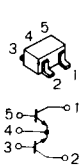
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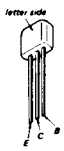
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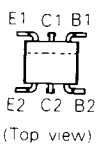
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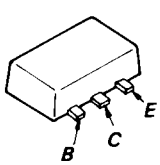


(Top view)

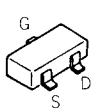
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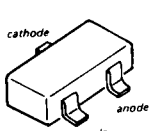
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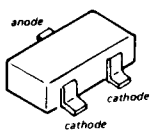
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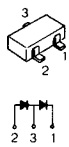
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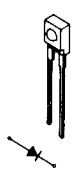
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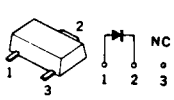
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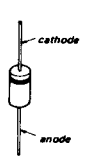
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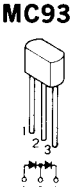
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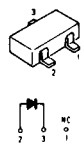
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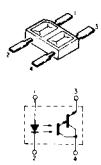
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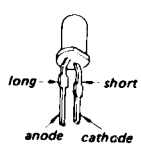
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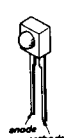
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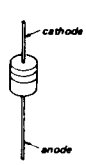
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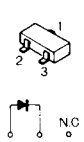
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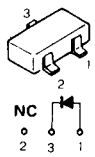
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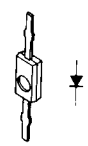
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1T32



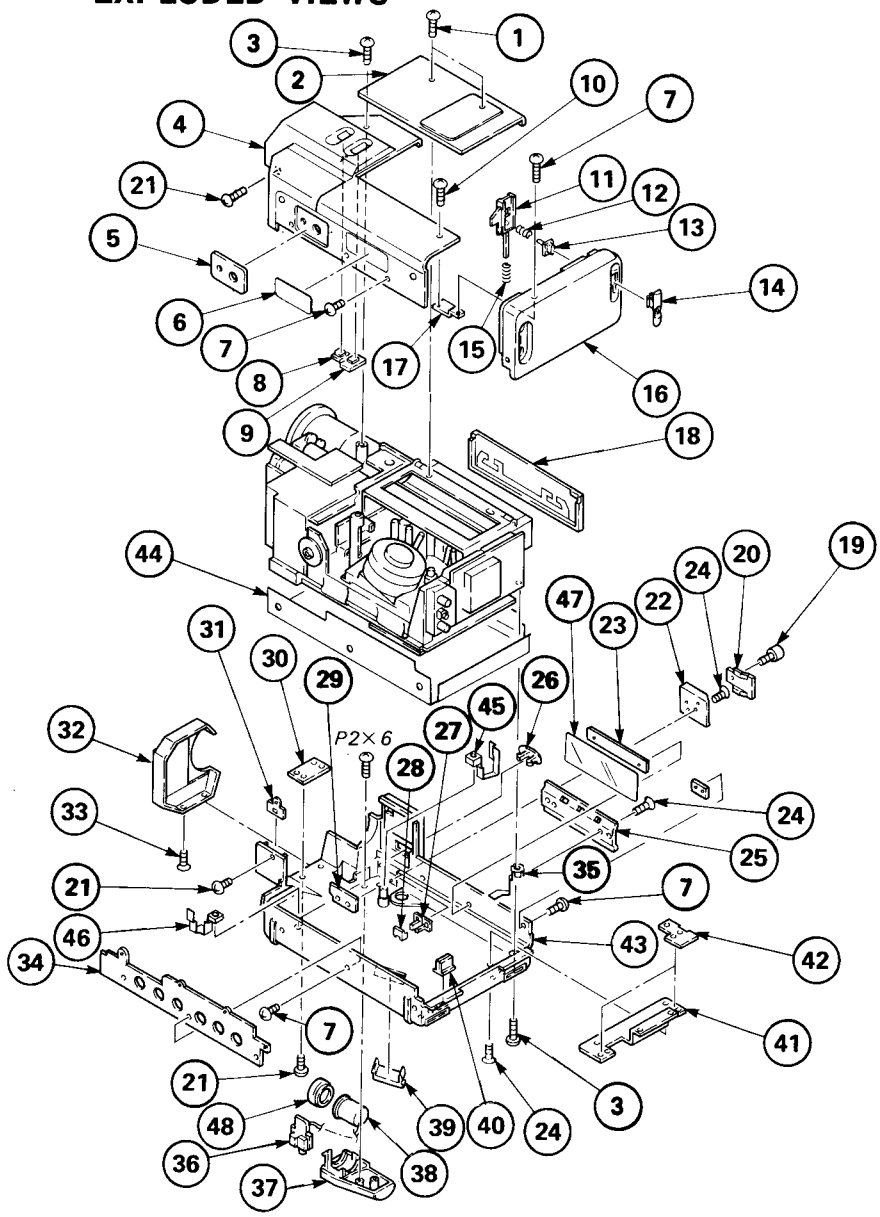
SECTION 5
EXPLODED VIEWS

5-1. CABINET ASSEMBLY

NOTE:

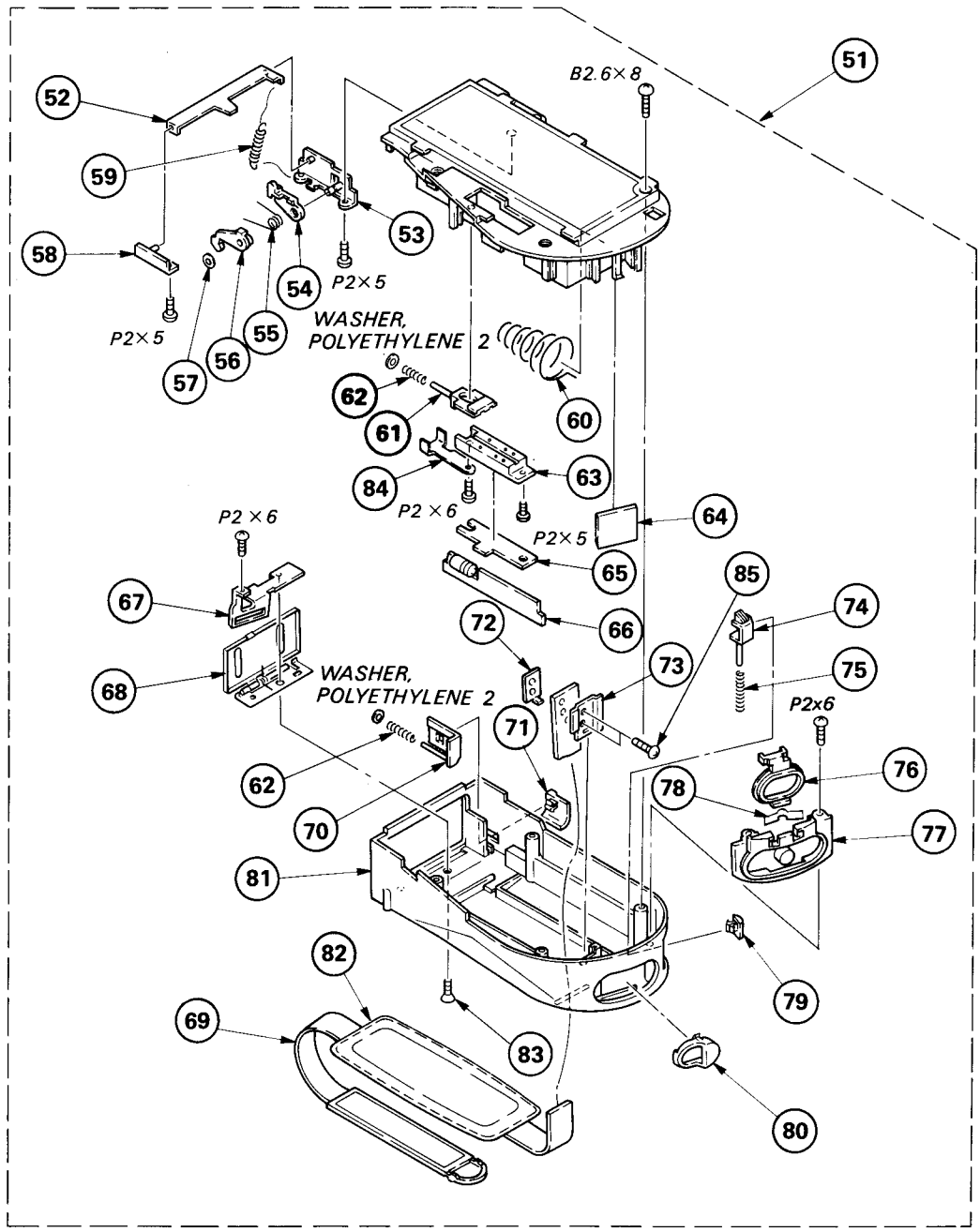
- Itmes with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.



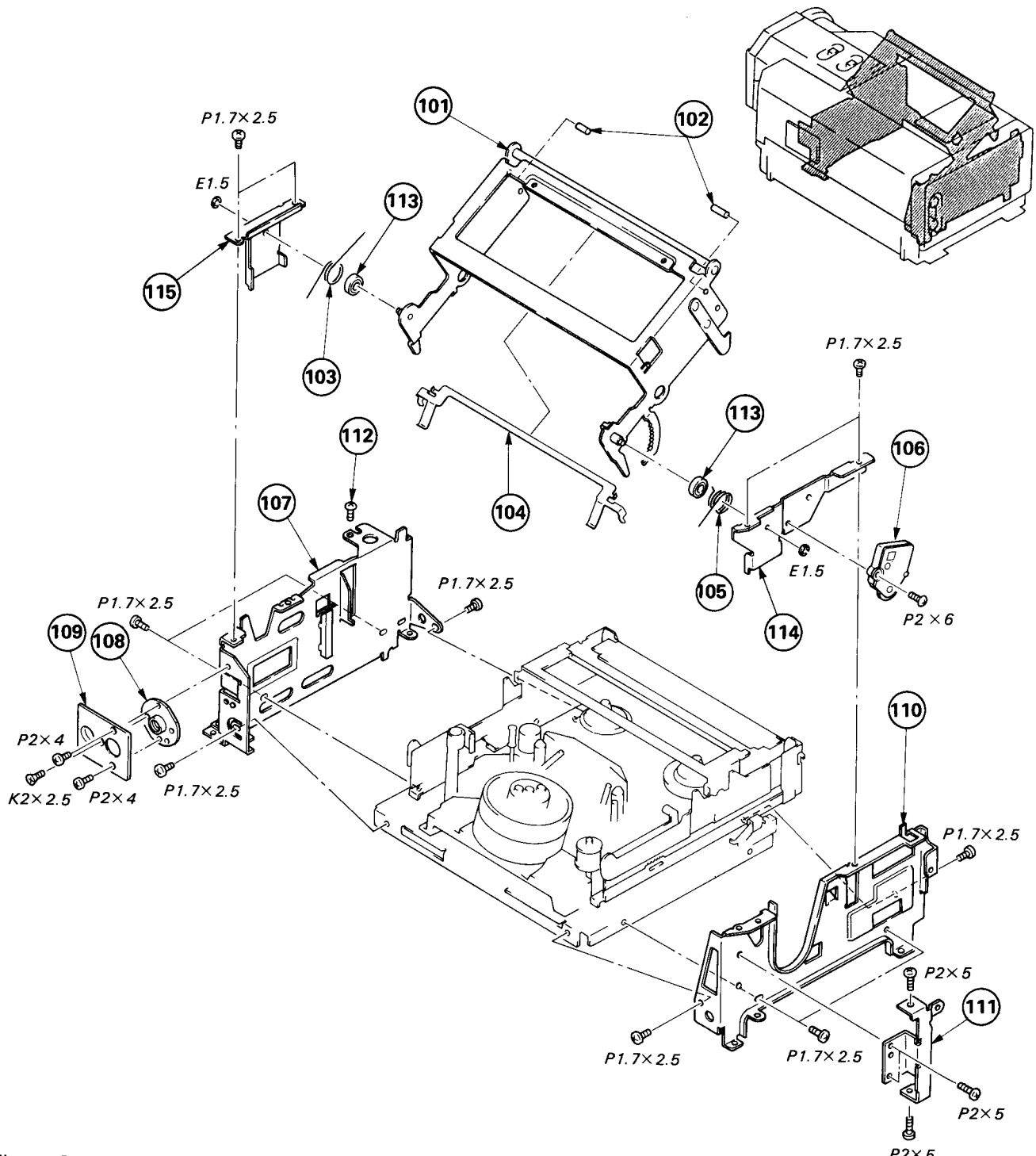
No.	Part No.	Description	Remark
1	3-713-791-01	SCREW (M1.7X5), TAPPING, P2	
2	X-3712-094-1	LID ASSY, CASSETTE (BLACK)	
	X-3712-099-1	LID ASSY, CASSETTE (AEP SILVER)	
3	3-713-912-01	SCREW (M2X10)	
4	X-3712-096-1	CABINET (RIGHT) ASSY (BLACK)	5
	X-3712-101-1	CABINET (RIGHT) ASSY (AEP SILVER)	
5	3-712-035-01	PLATE, BOTTOM	
6	*3-713-513-01	LABEL, MODEL NUMBER (AEP)	
	*3-713-514-01	LABEL, MODEL NUMBER (E/SWITZERLAND/UK AS)	
7	3-713-786-01	SCREW (M2X4)	
8	3-712-188-01	KNOB, AF	
9	3-712-187-01	KNOB, AWB	
10	3-713-786-01	SCREW (M2X6)	
11	3-713-747-01	KNOB (B), EJECT	
12	3-699-532-02	SPRING, COMPRESSION	
13	3-699-534-01	KNOB, LOCK	
14	3-699-537-01	KNOB, EJECT	
15	3-713-905-01	SPRING, COMPRESSION	
16	X-3712-062-1	PANEL ASSY, REAR (BLACK)	
	X-3712-075-1	PANEL ASSY, REAR (AEP SILVER)	
17	3-712-193-01	JOINT, CABINET	
18	X-3712-046-1	LID ASSY, LS CASSETTE (BLACK)	
	X-3712-070-1	LID ASSY, LS CASSETTE (AEP SILVER)	5
19	3-678-103-11	SCREW, EVF STOPPER	
20	3-688-940-01	SPRING, LEAF	
21	3-713-786-21	SCREW (M2X3)	
22	3-688-985-01	SHOE, ACCESSORY	
23	3-713-914-01	BRACKET, EVF SHOE	
24	3-713-788-01	SCREW (M2X5)	
25	3-713-782-01	RAIL, GUIDE	
26	3-713-748-01	KNOB (A), SELECT	
27	3-713-717-01	KNOB (B), SELECT	
28	3-713-793-01	PIECE, SELECT KNOB LOCK	
29	3-713-715-01	BRACKET, SHOE	
30	3-713-718-01	JOINT, F/L	
31	3-713-720-01	JOINT, CABINET (R/L)	
32	X-3712-047-1	CABINET ASSY, FRONT (BLACK)	
	X-3712-071-2	CABINET ASSY, FRONT (AEP SILVER)	
33	3-713-789-11	SCREW (M1.7X3)	
34	3-713-776-01	JOINT, CABINET (R)	
35	*3-713-965-01	PLATE (C), GROUND	
36	A-7070-426-A	MJ-12 BOARD, COMPLETE	
37	3-713-764-11	HOUSING, MICROPHONE	
37	3-713-764-51	HOUSING, MICROPHONE (AEP SILVER)	
38	1-542-087-12	MICROPHONE, ELECTRET CONDENSER	
39	1-563-653-21	SOCKET (TERMINAL BOARD B) 7P	
40	3-713-714-01	KNOB, EDIT	
41	3-713-774-01	JOINT, REAR	
42	3-713-713-01	BRACKET, STRAP	
43	X-3712-095-1	CABINET (LEFT) ASSY (BLACK)	
	X-3712-100-1	CABINET (LEFT) ASSY (AEP SILVER)	
44	*3-713-930-01	PLATE, SHIELD, CABINET (L)	
45	*3-713-964-01	PLATE (B), GROUND	
46	*3-713-963-01	PLATE (A), GROUND	
47	*3-713-974-01	SHEET, INSULATING	
48	3-716-448-01	WIND SCREEN	

5-2. GRIP ASSEMBLY



No.	Part No.	Description	Remark
51	A-7080-322-A	GRIP BLOCK ASSY	52-85
52	3-712-198-01	PLATE, LOCK, B	
53	X-3712-055-1	SUPPORT (UPPER) ASSY, B LOCK	
54	3-713-750-01	RETAINER, LOCK PLATE	
55	3-713-704-01	SPRING, TORSION	
56	3-713-751-01	LEVER, RELEASE, B	
57	3-321-813-11	WASHER, COTTER POLYETHYLENE	
58	X-3712-056-1	SUPPORT (LOWER) ASSY, B LOCK	
59	3-307-377-11	SPRING, TENSION	
60	3-713-935-01	SPRING	
61	3-713-708-01	COVER, TERMINAL	
62	3-564-951-00	SPRING, COMPRESSION	
63	1-566-219-12	SOCKET (TERMINAL BOARD A)	
64	*1-620-827-21	RC-21 BOARD	
65	*1-620-941-11	TA-48 BOARD	
66	*1-620-825-21	FH-8 BOARD	
67	3-712-516-01	BRACKET (B), BELT	
68	X-3712-010-1	LID ASSY, BATTERY	
69	3-713-796-02	BELT, GRIP	
70	3-713-703-01	CLAW, B RELEASE	
71	3-713-749-01	KNOB, B RELEASE	
72	3-713-711-02	BRACKET (C), BELT	
73	3-713-710-01	BRACKET (A), BELT	
74	3-713-707-01	LEVER, RELEASE, G	
75	3-465-047-00	SPRING, COMPRESSION	
76	3-713-753-01	HOLDER, PS KEY TOP	
77	X-3712-045-1	HOLDER ASSY, REC BUTTON	
78	3-713-709-01	SPRING	
79	3-713-706-01	KNOB, G RELEASE	
80	3-713-723-01	KEY TOP, PS	
81	X-3712-061-2	CABINET (L) ASSY, GRIP	
82	3-712-061-01	PAD, GRIP	
83	3-713-787-01	SCREW (M2X4)	
84	*3-713-938-01	RETAINER, TERMINAL COVER	
85	3-712-069-01	SCREW (M2X5)	

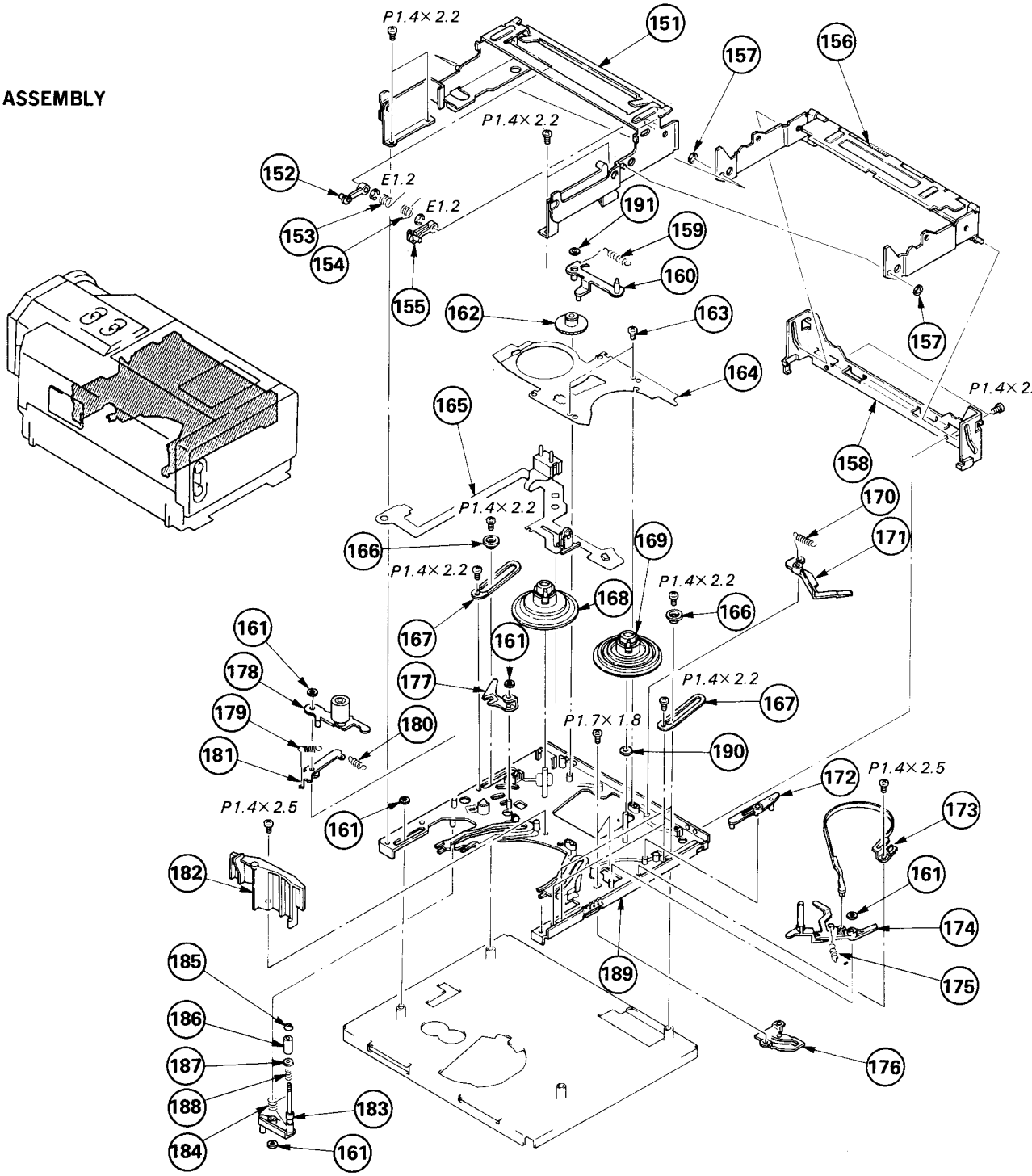
5-3. CASSETTE COMPARTMENT ASSEMBLY



No.	Part No.	Description	Remark
101	X-3712-034-1	ARM ASSY (2), CASSETTE	102, 104
102	3-695-602-01	SHAFT, RIVETING, CASSETTE ARM	
103	3-695-582-01	SPRING, TORSION	
104	3-695-580-01	RETAINER, CASSETTE COMPARTMENT	
105	3-695-581-01	SPRING, TORSION	
106	3-681-528-11	DAMPER	

No.	Part No.	Description	Remark
107	*X-3712-033-1	FRAME (A) ASSY (2)	
108	3-695-401-01	SCREW, TRIPOD	
109	*3-713-719-01	SPCER, 3 LEG PLATE	
110	*X-3712-026-2	FRAME (B) ASSY (2)	
111	*3-712-197-01	BRACKET, JACK	
112	3-713-790-01	SCREW (M2X5), TAPPING, P3	
113	3-695-512-02	COLLAR, CASSETTE ARM	
114	3-695-641-01	PLATE (S2), SIDE	
115	3-695-603-01	PLATE (T2), SIDE	

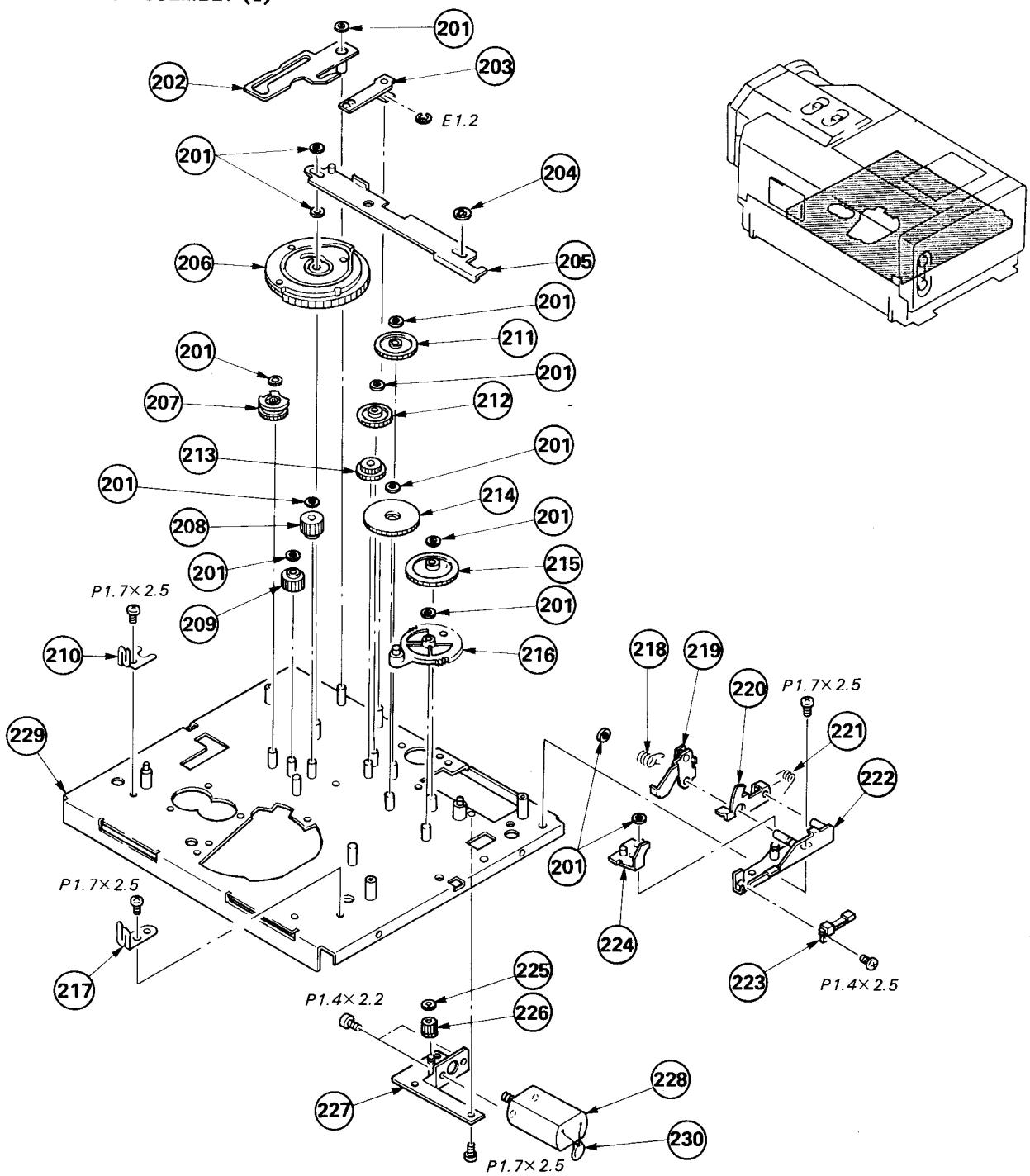
5-4. LS ASSEMBLY



No.	Part No.	Description	Remark
151	X-3695-447-4	COMPARTMENT ASSY, CASSETTE, LS	
152	3-695-595-01	RETAINER (T), CASSETTE	
153	3-695-605-01	SPRING, TORSION	
154	3-695-604-01	SPRING, TORSION	
155	3-695-594-01	RETAINER (S), CASSETTE	
156	X-3695-448-3	ARM ASSY, BLIND	
157	3-669-465-00	WASHER (1.5), STOPPER	
158	3-695-646-01	ARM, LS	
159	3-695-718-01	SPRING, TENSION	
160	X-3712-037-1	LEVER (A) ASSY (2)	
161	3-315-384-31	WASHER, STOPPER	
162	X-3712-025-1	GEAR ASSY, TS	
163	3-699-402-01	SCREW (M1.3X5.5), TAPPING	
164	3-712-165-01	PLATE (2), STOPPER	
165	A-7060-693-A	FP-53 BOARD, COMPLETE	
166	3-695-698-01	GUIDE, LS	
167	3-695-697-01	SPRING, LEAF, LS	
168	X-3695-436-1	TABLE ASSY, REEL, TAKE-UP	
169	X-3712-038-1	TABLE ASSY (2), REEL, SUPPLY	190
170	3-695-717-01	SPRING, TENSION	
171	3-712-151-01	BRAKE (2), SOFT	

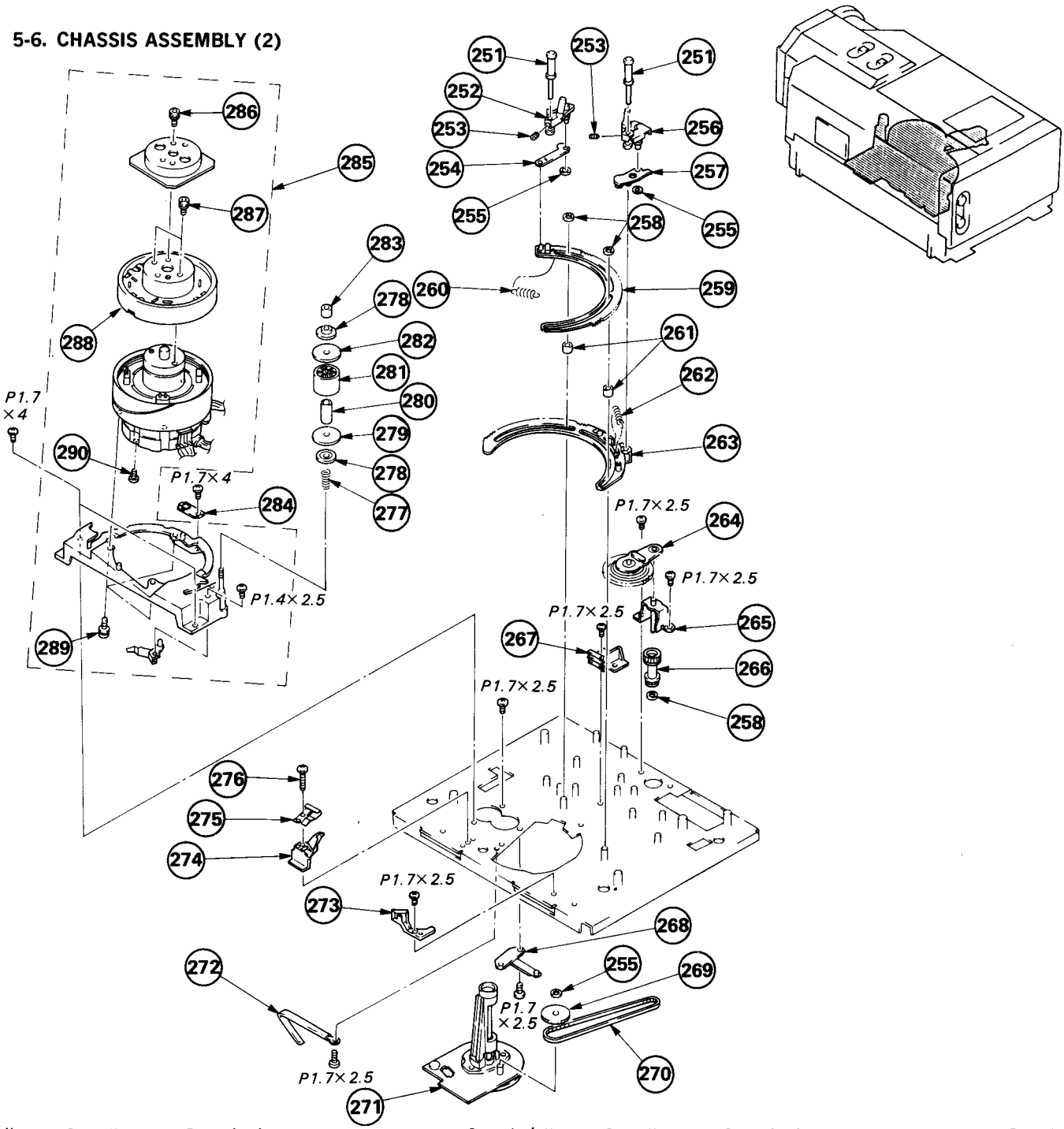
No.	Part No.	Description	Remark
172	3-695-735-01	ARM, TG1 RELEASE	
173	X-3695-432-1	BAND ASSY, TG1	
174	X-3712-019-1	ARM ASSY (2), TG1	
175	3-695-591-01	SPRING, TENSION	
176	3-695-733-01	PLATE, CAM, LS	
177	X-3712-022-1	ARM (B) ASSY (2), PINCH	
178	X-3712-032-2	ARM (C) ASSY (2), PINCH	
179	3-695-622-01	SPRING, TENSION	
180	3-695-719-01	SPRING, TENSION	
181	X-3695-415-1	PINCH LEVER ASSY	
182	3-695-624-01	BASE, PROTECT	
183	X-3712-027-1	ARM ASSY (2), TG7	
184	3-695-541-01	SPRING	
185	3-712-158-01	FLANGE, UPPER, TG7	
186	3-712-160-01	SLEEVE (2), TG7	
187	3-712-159-01	FLANGE, LOWER, TG7	
188	3-712-157-01	SPRING, COMPRESSION	
189	X-3712-035-1	CHASSIS ASSY (2), LS	
190	3-701-444-01	WASHER, 6	
191	3-321-393-01	WASHER, STOPPER	

5-5. CHASSIS ASSEMBLY (1)



No.	Part No.	Description	Remark
201	3-315-384-31	WASHER, STOPPER	
202	X-3712-023-1	ARM (A) ASSY (2), PINCH	
203	3-695-589-01	LEVER (B), REEL LOCK	
204	3-669-465-00	WASHER (1.5), STOPPER	
205	X-3695-439-1	SLIDER ASSY, M	
206	X-3712-031-1	CAM ASSY (2)	
207	3-712-156-01	GEAR (M) (2), THREADING	
208	3-695-537-01	GEAR (T), THREADING	
209	3-695-536-01	GEAR (S), THREADING	
210	*3-695-706-01	SPRING (T)	
211	3-695-559-01	GEAR (B), THREADING	
212	3-695-724-01	GEAR (D), THREADING	
213	3-712-162-02	GEAR (C) (2), THREADING	
214	3-695-714-01	GEAR (A), LS	
215	3-695-563-04	GEAR (B), LS	
216	X-3695-417-1	GEAR (C) ASSY, LS	
217	*3-695-705-01	SPRING (S)	
218	3-713-937-01	SPRING (A) (2)	
219	X-3695-418-1	ARM ASSY, LOCK	
220	3-695-574-01	ARM, RETURN PREVENTION	
221	3-695-579-01	SPRING (B), TORSION	
222	X-3712-018-1	BASE ASSY (2), LOCK	
223	1-553-226-00	SWITCH, LEAF (CCD SW) S902	
224	X-3695-438-1	ARM ASSY, EJECT	
225	3-321-393-01	WASHER, STOPPER	
226	3-712-150-01	WHEEL, WORM	
227	X-3712-017-1	HOLDER ASSY, MOTOR	
228	8-835-222-01	MOTOR, DC LA14-323F (LOADING) M903	
229	X-3712-036-1	CHASSIS ASSY (2), MECHANICAL	
230	1-161-013-00	CAP, CERAMIC 0.01MF	

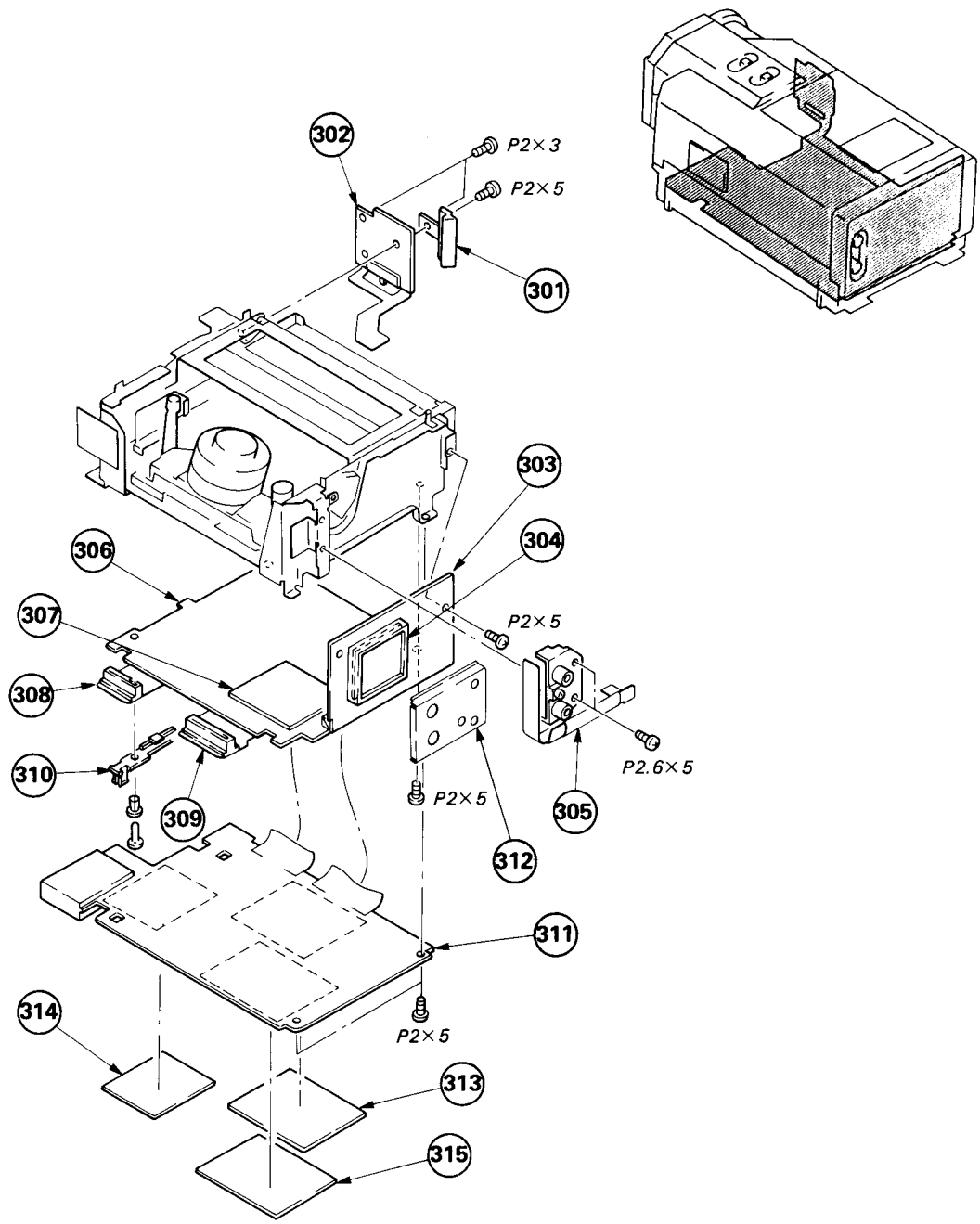
5-6. CHASSIS ASSEMBLY (2)



No.	Part No.	Description	Remark
251	X-3712-029-1	ROLLER ASSY (2), GUIDE	
252	X-3712-030-1	BASE ASSY (2), TG5	
253	3-695-770-01	SCREW, GR LOCK	
254	3-695-545-01	JOINT, T	
255	3-321-393-01	WASHER, STOPPER	
256	X-3712-028-1	BASE ASSY (2), TG4	
257	X-3695-429-1	JOINT ASSY, S	
258	3-315-384-31	WASHER, STOPPER	
259	X-3695-414-1	SLIDER (T) ASSY, THREADING	
260	3-695-773-01	SPRING, TENSION	
261	3-695-544-01	ROLLER, GUIDE	
262	3-695-772-01	SPRING, TENSION	
263	X-3695-428-1	SLIDER (S) ASSY, THREADING	
264	X-3712-024-1	ARM ASSY (2), GEAR	
265	X-3712-020-1	BASE ASSY (2), MIDWAY PULLEY	
266	X-3712-021-1	PULLEY ASSY (2), MIDWAY	
267	3-712-163-01	SUPPORT (2), SLIDER	
268	1-535-574-11	TERMINAL, SHAFT GROUND	
269	X-3695-413-1	GEAR ASSY, CHANGE	
270	3-695-637-01	BELT, RELAY	

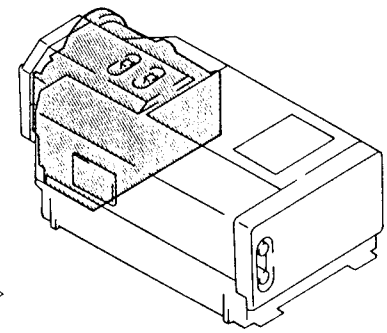
No.	Part No.	Description	Remark
271	8-835-223-01	MOTOR, DC BHF-3301B (CAPSTAN) M902	
272	3-712-161-01	CLAMP	
273	3-695-627-01	STOPPER, SLIDER, S	
274	3-695-628-01	STOPPER, SLIDER, T	
275	3-695-677-01	SPRING (T), LEAF	
276	3-695-519-01	SCREW, FITTING, LEAF SPRING(T)	
277	3-695-532-01	SPRING, COMPRESSION	
278	3-695-727-01	RETAINER, FLANGE, UPPER	
279	3-695-794-01	FLANGE, LOWER, TG2	
280	3-695-530-01	SLEEVE, TG2	
281	3-712-164-01	ROLLER (2), TG2	
282	3-695-528-01	FLANGE, TG2	
283	3-695-529-01	NUT, TG2	
284	1-807-238-11	SENSOR, DEW CONDENSATION	
285	A-7048-081-A	DRUM ASSY (DGU-19A-R)	286-290
286	3-686-422-01	WASHER (2X2.7), BOLT, HOLE	
287	3-686-403-01	SCREW (2X5), BOLT WASHER	
288	A-7049-107-A	DRUM ASSY, UPPER (DGR-19-R)	
289	3-686-444-02	SCREW +P 2X5.5	
290	3-686-458-01	SCREW (P1.4X2.5), TAPPING	

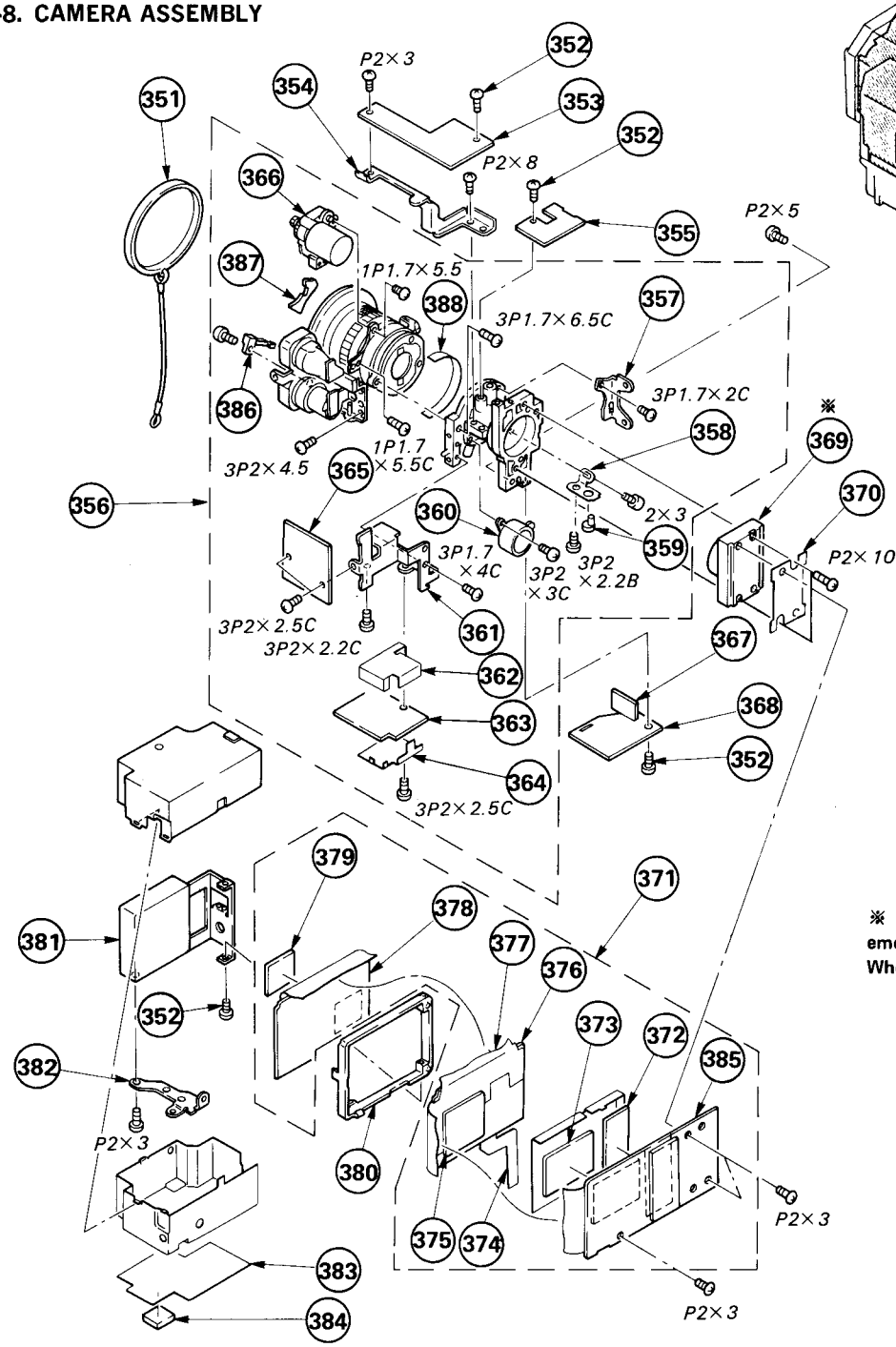
5-7. MAIN BOARD ASSEMBLY



No.	Part No.	Description	Remark
301	3-713-794-01	SUPPORT, FUNCTION BOARD	
302	1-620-630-12	SK-15 FLEXIBLE BOARD	
303	*A-7060-772-A	MR-8 BOARD, COMPLETE	304
304	A-7068-074-A	RP34 BOARD, COMPLETE	
305	1-620-629-11	FP-49 FLEXIBLE BOARD	
306	*A-7060-790-A	SS-70 BOARD, COMPLETE	307-309
307	*A-7060-771-A	AU-31 BOARD, COMPLETE	
308	A-7090-594-A	CONNECTOR BLOCK ASSY (A)	
309	A-7090-595-A	CONNECTOR BLOCK ASSY (B)	
310	3-713-761-01	HOLDER, MV PC BOARD	
311	*A-7060-767-A	MV-12 BOARD, COMPLETE	312-315
312	*3-713-990-01	CASE (UPPER), SHIELD, RP	
313	A-7068-070-A	VC-11 BOARD, COMPLETE (HIC)	
314	A-7068-072-A	VD-6 BOARD, COMPLETE (HIC)	
315	A-7068-071-A	VY-9 BOARD, COMPLETE (HIC)	

5-8. CAMERA ASSEMBLY

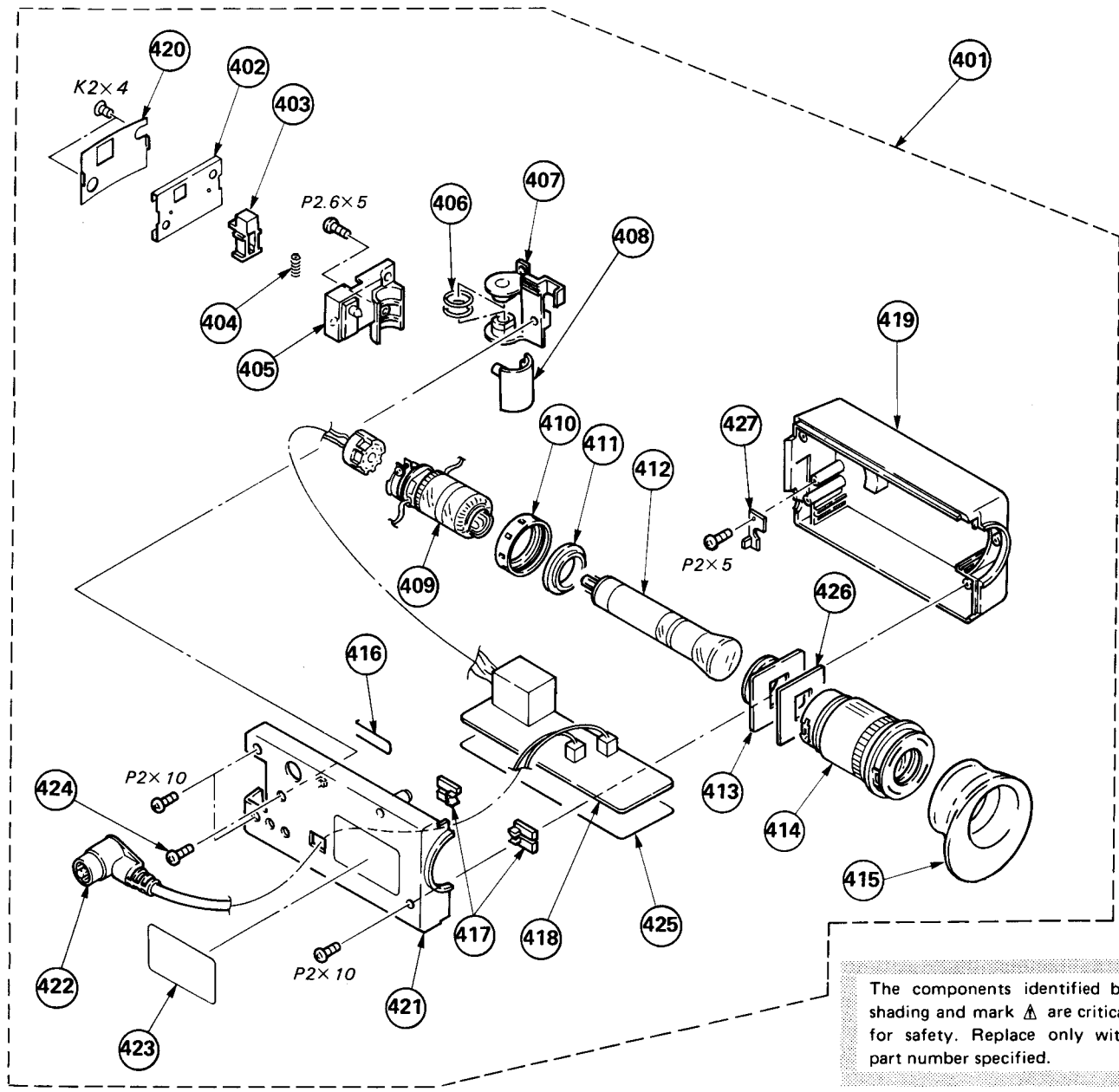




※ Be sure to read Precautions for Replacement of CCD Imager (369) on page 74. When changing the CCD Imager.

No.	Part No.	Description	Remark
351	X-3712-051-1	CAP ASSY, LENS	
352	3-713-790-01	SCREW (M2X5), TAPPING, P3	
353	*1-620-620-11	SW-55 BOARD	
354	*3-713-731-01	HOLDER, SW-55 PC BOARD	
355	*A-7070-425-A	MA-21 BOARD, COMPLETE	
356	1-547-228-11	LENS, ZOOM (VC-1225 YA)	
			357-366, 386-388
357	*3-707-280-01	BRACKET, PC BOARD (2)	
358	*3-707-278-01	BRACKET, FB ADJUSTMENT	
359	3-707-281-01	ROLLER, FB ADJUSTMENT	
360	3-707-279-01	METER ASSY, EE (IRIS) M904	
361	*3-707-283-01	BRACKET, PC BOARD (1)	
362	*3-707-277-02	CASE, SHIELD (1)	
363	*A-7070-407-A	AF-30 BOARD, COMPLETE	
364	*3-707-282-02	CASE, SHIELD (2)	
365	*A-7070-406-A	AF-29 BOARD, COMPLETE	
366	*8-835-219-01	MOTOR, DC DNR-6303A (FOCUS) M905	
367	*A-7070-423-A	AS-15 BOARD, COMPLETE	
368	*A-7085-002-A	AW.AS BOARD, COMPLETE	367
369	8-750-010-37	IU021CK-BA(CCD IMAGER)	
370	*3-690-235-01	SHEET, INSULATING, CCD	
371	*A-7030-057-A	PC BOARD ASSY, CAM	
			353, 355, 367, 368, 372-379, 385
372	A-7068-056-A	DT-61 BOARD, COMPLETE (HIC)	
373	A-7068-057-A	SH-2 BOARD, COMPLETE (HIC)	
374	1-620-626-11	FP-34 FLEXIBLE BOARD	
375	A-7060-082-A	MX-2 BOARD, COMPLETE	
376	*A-7060-775-A	VC-21 BOARD, COMPLETE	375
377	1-620-624-11	FP-33 FLEXIBLE BOARD	
378	*A-7060-776-A	VC-22 BOARD, COMPLETE	379
379	*A-7060-739-A	IA-1 (A) BOARD, COMPLETE	
380	*3-713-726-01	HOLDER (UPPER), VC PC BOARD	
381	1-464-726-11	CONVERTER UNIT, DC-DC	
382	*3-713-727-01	HOLDER (LOWER), VC PC BOARD	
383	*3-713-721-01	SHEET (L), INSULATING, CAMERA	
384	3-713-907-01	SPACER, CAM	
385	*A-7060-774-A	VC-20 BOARD, COMPLETE	372, 373
386	1-570-999-11	SWITCH, LEAF (F LIMIT SW) S901	
387	3-707-291-01	RUBBER, ABSORBENT (D)	
388	*3-713-956-01	SHEET, BLIND	

5-9. EVF ASSEMBLY



No.	Part No.	Description	Remark
401	A-7019-051-A	EVF ASSY (AEP/E/AS MODEL)	402-427
	A-7019-054-A	EVF ASSY (UK MODEL)	
402	3-713-550-01	LINING, EVF	
403	3-713-742-01	BUTTON, LOCK	
404	3-480-102-00	SPRING, COMPRESSION	
405	X-3712-054-1	HINGE (A) ASSY, EVF	
406	3-146-316-11	RING, RUBBER	
407	3-713-741-01	BASE, HINGE	
408	3-713-556-01	HINGE (B), EVF	
409	⚠1-451-296-21	DEFLECTION YOKE (BLACK & WHITE)	
410	3-713-534-01	RETAINER, CRT	
411	*3-712-660-01	RING, RUBBER	
412	⚠1-546-061-11	CATHODE-RAY TUBE, B/W	
413	3-712-183-01	COVER, CRT	
414	A-7080-263-A	FINDER BLOCK ASSY	
415	3-713-548-01	CUP, EYE	
416	3-713-533-01	SHAFT, HINGE LOCK	
417	3-712-184-01	RETAINER, CORD	
418	*A-7060-777-A	VF-10 BOARD, COMPLETE	427
419	X-3712-052-1	CABINET (UPPER) ASSY, EVF	
420	3-713-781-01	LINING, SPRING	
421	X-3712-053-2	CABINET (LOWER) ASSY, EVF	
423	*3-713-519-01	LABEL, MODEL NUMBER, EVF AEP/E/AS MODEL	
	*3-713-518-01	LABEL, MODEL NUMBER, EVF UK MODEL	
424	3-713-559-01	SCREW (2X6)	
425	*3-714-005-01	SHEET, INSULATING	
426	3-713-985-01	PLATE, CRT	
427	*1-621-803-11	LD-7 BOARD	

5-10. HARDWARE LIST

SCREW

7-621-255-45	SCREW +P 2X6
7-621-591-00	SCREW +K 2X4
7-621-770-87	SCREW +P 2.6X5
7-621-772-40	SCREW +B 2X8
7-621-775-20	SCREW +P 2.6X5
7-627-452-48	SCREW,PRECISION +K 2X2.5
7-627-553-47	SCREW,PRECISION +P 2X4
7-627-553-67	SCREW,PRECISION +P 2X5
7-627-553-77	SCREW,PRECISION +P 2X10
7-627-850-17	SCREW,PRECISION +P 1.4X2.5
7-627-852-03	SCREW,PRECISION +P 1.7X2.5
7-627-852-18	SCREW,PRECISION +P 1.7X4 TYPE3
7-627-852-38	SCREW,PRECISION +P1.7X1.8TYPE3
7-627-853-27	PRECISION SCREW +P 2X3 TYPE 3
7-627-853-58	SCREW, PRECISION +P 2X5 TYPE3
7-627-853-87	PRECISION SCREW +P 2X8 TYPE 3
7-685-103-14	SCREW +P 2X5 TYPE2 NON-SLIT
7-685-103-19	SCREW +P 2X5 TYPE2 NON-SLIT
7-685-104-14	SCREW +P 2X6 TYPE2 NON-SLIT
7-685-104-19	SCREW +P 2X6 TYPE2 NON-SLIT
7-685-106-19	SCREW +P 2X10 TYPE2 NON-SLIT
7-685-134-19	SCREW +BTP 2.6X8 TYPE2 N-S

STOP RING

7-624-101-01	STOP RING 1.2 (E TYPE)
7-624-102-04	STOP RING 1.5, TYPE -E

WASHER

7-623-922-01	WASHER 2.0, NYLONE

SECTION 6
ELECTRICAL PARTS LIST

CAMERA BOARD

VC-20 **DT-61** **SH-2**

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS
- All resistors are in ohms
- F : nonflammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

CAPACITORS
- MF : μF, PF : μμF

COILS
- MMH : mH, UH : μH

Ref.No	Part No.	Description			Remark
	*A-7030-057-A	CAM BOARD ASSY (VC-20, VC-21, VC-22, AW-4, SW-55, AS-15 and MA-21 BOARD) **********			
	1-620-624-11	FP-33 BOARD, FLEXIBLE			
	*A-7060-774-A	VC-20 BOARD, COMPLETE **********			
	A-7068-056-A	DT-61 BOARD (HIC), COMPLETE			
		IC			
IC001	8-759-922-28	IC CX23047B			
IC002	8-750-010-37	IC IU021CK-BA (A PAIR OF IC701)			
IC003	8-752-018-00	IC CX20180			
IC004	8-759-011-75	IC MMH0026D			
	A-7068-057-A	SH-2 BOARD (HIC), COMPLETE			
		IC			
IC001	8-759-908-09	IC CX20053			
		VC-20 BOARD			
		CAPACITOR			
C701	1-162-637-11	CERAMIC CHIP 0.47MF			16V
C702	1-162-637-11	CERAMIC CHIP 0.47MF			16V
C703	1-135-083-00	TANTAL. CHIP 0.47MF		20%	25V
C704	1-135-083-00	TANTAL. CHIP 0.47MF		20%	25V
C705	1-162-637-11	CERAMIC CHIP 0.47MF			16V
C706	1-163-129-00	CERAMIC CHIP 330PF		5%	50V
C707	1-162-637-11	CERAMIC CHIP 0.47MF			16V
C708	1-163-101-00	CERAMIC CHIP 22PF		5%	50V
C709	1-163-101-00	CERAMIC CHIP 22PF		5%	50V
C710	1-163-109-00	CERAMIC CHIP 47PF		5%	50V
C721	1-163-089-00	CERAMIC CHIP 6PF		0.5PF	50V
C722	1-163-111-00	CERAMIC CHIP 56PF		5%	50V
C723	1-163-111-00	CERAMIC CHIP 56PF		5%	50V
C724	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V
C725	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V
C726	1-163-035-00	CERAMIC CHIP 0.047MF		10%	25V
C732	1-163-109-00	CERAMIC CHIP 47PF		5%	50V
C733	1-163-109-00	CERAMIC CHIP 47PF		5%	50V
C734	1-163-101-00	CERAMIC CHIP 22PF		5%	50V
C735	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V
C736	1-135-091-00	TANTAL. CHIP 1MF		20%	16V
C737	1-163-141-00	CERAMIC CHIP 0.001MF		10%	50V
C738	1-163-109-00	CERAMIC CHIP 47PF		5%	50V
C739	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V
C740	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V
C741	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V
C743	1-163-101-00	CERAMIC CHIP 22PF		5%	50V
C744	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V
C745	1-135-100-21	TANTAL. CHIP 6.8MF		20%	6.3V
C746	1-163-035-00	CERAMIC CHIP 0.047MF		10%	25V
C751	1-124-229-00	ELECT	33MF	20%	10V
C752	1-163-013-00	CERAMIC CHIP	0.0022MF	10%	50V
C753	1-163-013-00	CERAMIC CHIP	0.0022MF	10%	50V
C754	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C755	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C761	1-124-222-00	ELECT	22MF	20%	6.3V
C762	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C763	1-131-387-00	TANTALUM	47MF	10%	6.3V
C764	1-124-234-00	ELECT	22MF	20%	16V
C765	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C766	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C767	1-124-234-00	ELECT	22MF	20%	16V
C768	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C769	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C770	1-124-234-00	ELECT	22MF	20%	16V
C771	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C772	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C773	1-124-234-00	ELECT	22MF	20%	16V
C774	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V
C775	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V
		TRIMMER			
CT721	1-141-331-11	CAP, VAR, TRIMMER (CHIP) 330PF			
CT731	1-141-329-11	CAP, VAR, TRIMMER (CHIP) 10PF			
		DIODE			
D701	8-719-801-45	DIODE 1SS187			
D731	8-713-220-00	DIODE 1T32-2			
		IC			
IC701	8-750-010-37	IC IU021CK-BA (CCD IMAGER)			
IC731	8-752-321-16	IC CXD1030M			
		COIL			
L731	1-410-389-11	INDUCTOR CHIP 47UH			
L761	1-407-165-XX	MICRO INDUCTOR 47UH			
L762	1-408-960-21	MICRO INDUCTOR 1.5UH			
L763	1-408-960-21	MICRO INDUCTOR 1.5UH			
L764	1-407-165-XX	MICRO INDUCTOR 47UH			
		TRANSISTOR			
Q701	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q721	8-729-175-73	TRANSISTOR 2SC2757			
Q722	8-729-175-73	TRANSISTOR 2SC2757			
Q731	8-729-100-76	TRANSISTOR 2SA812			
Q732	8-729-100-67	TRANSISTOR 2SA812-TL7			

※ The IC701 and IC002 have not been mounted on the already mounted VC-20 board and DT-61 board respectively.
Be sure to read "Precautions for Replacement of CCD Imager " on page 74. When changing the mounted VC-20 board and CCD Imager.

VC-20 VC-21 MX-2 VC-22 IA-1

Ref.No	Part No.	Description				Remark
		RESISTOR				
R701	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R702	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R703	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R704	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R705	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R706	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R707	1-216-025-00	METAL CHIP	100	5%	1/10W	
R708	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R709	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R721	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R722	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R723	1-216-039-00	METAL CHIP	390	5%	1/10W	
R724	1-216-039-00	METAL CHIP	390	5%	1/10W	
R725	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R726	1-216-041-00	METAL CHIP	470	5%	1/10W	
R727	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R732	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R733	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R734	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R735	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R736	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R738	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R739	1-216-295-00	METAL CHIP	0	5%	1/10W	
R740	1-216-025-00	METAL CHIP	100	5%	1/10W	
R741	1-216-093-00	METAL CHIP	68K	5%	1/10W	
R742	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R743	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R744	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R745	1-216-033-00	METAL CHIP	220	5%	1/10W	
R746	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R747	1-216-033-00	METAL CHIP	220	5%	1/10W	
R751	1-216-025-00	METAL CHIP	100	5%	1/10W	
R752	1-216-049-00	METAL CHIP	1K	5%	1/10W	
		CRYSTAL				
X721	1-567-732-11	VIBRATOR, CRYSTAL (28.3750MHz)				
X731	1-567-733-11	VIBRATOR, CRYSTAL (17.7MHz)				

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*A-7060-775-A VC-21 BOARD, COMPLETE
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A-7060-082-A MX-2 BOARD (HIC), COMPLETE

IC

IC821	8-752-015-10	IC CX20151
IC822	8-752-303-90	IC CX23039

VC-21 BOARD

CAPACITOR

C781	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C782	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C783	1-163-213-00	CERAMIC CHIP	0.0022MF	10%	50V
C784	1-163-213-00	CERAMIC CHIP	0.0022MF	10%	50V
C785	1-163-213-00	CERAMIC CHIP	0.0022MF	10%	50V
C786	1-124-234-00	ELECT	22MF	20%	10V
C787	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C788	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C789	1-124-584-00	ELECT	100MF	20%	10V
C790	1-135-105-00	TANTAL. CHIP	33MF	20%	4V
C791	1-135-105-00	TANTAL. CHIP	33MF	20%	4V

FILTER

FL781	1-235-442-11	FILTER, LOW PASS (YH)

IC

IC781	8-759-914-44	IC TL431CLPB

COIL

L781	1-408-767-21	INDUCTOR CHIP	1.5UH
L782	1-410-369-11	INDUCTOR CHIP	1UH
L783	1-410-337-11	MICRO INDUCTOR	1UH
L784	1-410-337-11	MICRO INDUCTOR	1UH
L785	1-410-369-11	INDUCTOR CHIP	1UH
L786	1-408-785-21	INDUCTOR CHIP	47UH
L787	1-408-777-00	INDUCTOR CHIP	10UH

RESISTOR

R781	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R782	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R783	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R784	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R785	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R786	1-216-081-00	METAL CHIP	22K	5%	1/10W
R787	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R788	1-216-081-00	METAL CHIP	22K	5%	1/10W
R789	1-216-081-00	METAL CHIP	22K	5%	1/10W
R790	1-216-081-00	METAL CHIP	22K	5%	1/10W
R791	1-216-049-00	METAL CHIP	1K	5%	1/10W
R792	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R793	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R794	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R795	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R796	1-216-069-00	METAL CHIP	6.8K	5%	1/10W

VARIABLE RESISTOR

RV781	1-230-523-11	RES, ADJ, METAL GLAZE 10K
RV782	1-230-523-11	RES, ADJ, METAL GLAZE 10K

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*A-7060-776-A VC-22 BOARD, COMPLETE
****

*A-7060-739-A IA-1 BOARD (HIC), COMPLETE

IC

IC721	8-759-100-95	IC UPC324G2

VC-22 BOARD

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
		CAPACITOR			
C801	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C802	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C803	1-163-013-00	CERAMIC CHIP 0.0022MF	10%	50V	
C804	1-163-077-00	CERAMIC CHIP 0.1MF		50V	
C805	1-163-077-00	CERAMIC CHIP 0.1MF		50V	
C806	1-163-077-00	CERAMIC CHIP 0.1MF		50V	
C807	1-163-077-00	CERAMIC CHIP 0.1MF		50V	
C808	1-135-085-21	TANTAL. CHIP 4.7MF	20%	16V	
C809	1-163-077-00	CERAMIC CHIP 0.1MF		50V	
C810	1-135-093-21	TANTAL. CHIP 10MF	20%	6.3V	
C811	1-162-638-11	CERAMIC CHIP 1MF		16V	
C812	1-135-101-21	TANTAL. CHIP 22MF	20%	6.3V	
C813	1-163-077-00	CERAMIC CHIP 0.1MF		50V	
C814	1-163-103-00	CERAMIC CHIP 27PF	5%	50V	
C815	1-135-093-21	TANTAL. CHIP 10MF	20%	10V	
C816	1-135-093-21	TANTAL. CHIP 10MF	20%	10V	
C817	1-163-117-00	CERAMIC CHIP 100PF	5%	50V	
C861	1-135-092-21	TANTAL. CHIP 3.3MF	20%	16V	
C862	1-124-225-00	ELECT 100MF	20%	6.3V	
C863	1-163-081-00	CERAMIC CHIP 0.22MF		25V	
C881	1-135-101-21	TANTAL. CHIP 22MF	20%	6.3V	
C882	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C883	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C884	1-124-225-00	ELECT 100MF	20%	6.3V	
		CONNECTOR			
CN861	*1-564-003-00	PIN, CONNECTOR 4P			
CN881	*1-564-007-00	PIN, CONNECTOR 8P			
		DIODE			
D801	8-719-801-45	DIODE 1SS187			
D802	8-719-100-05	DIODE 1S2837			
D861	8-719-100-05	DIODE 1S2837			
		DELAY LINE			
DL801	1-415-448-21	DELAY LINE			
		IC			
IC801	8-759-908-11	IC CX20055			
		COIL			
L801	1-408-785-21	INDUCTOR CHIP 47UH			
L881	1-407-165-XX	MICRO INDUCTOR 47UH			
		TRANSISTOR			
Q801	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q802	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q803	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q804	8-729-100-76	TRANSISTOR 2SA812			
Q805	8-729-100-76	TRANSISTOR 2SA812			
Q806	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q807	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q808	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q809	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q861	8-729-901-00	TRANSISTOR DTC124EK			
Q862	8-729-100-76	TRANSISTOR 2SA812			
		RESISTOR			
R801	1-216-081-00	METAL CHIP	22K	5%	1/10W
R802	1-216-081-00	METAL CHIP	22K	5%	1/10W
R803	1-216-091-00	METAL CHIP	56K	5%	1/10W
R804	1-216-081-00	METAL CHIP	22K	5%	1/10W
R805	1-216-081-00	METAL CHIP	22K	5%	1/10W
R806	1-216-083-00	METAL CHIP	27K	5%	1/10W
R807	1-216-083-00	METAL CHIP	27K	5%	1/10W
R808	1-216-081-00	METAL CHIP	22K	5%	1/10W
R809	1-216-081-00	METAL CHIP	22K	5%	1/10W
R810	1-216-081-00	METAL CHIP	22K	5%	1/10W
R811	1-216-081-00	METAL CHIP	22K	5%	1/10W
R812	1-216-081-00	METAL CHIP	22K	5%	1/10W
R813	1-216-081-00	METAL CHIP	22K	5%	1/10W
R814	1-216-081-00	METAL CHIP	22K	5%	1/10W
R815	1-216-081-00	METAL CHIP	22K	5%	1/10W
R816	1-216-081-00	METAL CHIP	22K	5%	1/10W
R817	1-216-081-00	METAL CHIP	22K	5%	1/10W
R818	1-216-081-00	METAL CHIP	22K	5%	1/10W
R819	1-216-081-00	METAL CHIP	22K	5%	1/10W
R820	1-216-081-00	METAL CHIP	22K	5%	1/10W
R821	1-216-081-00	METAL CHIP	22K	5%	1/10W
R822	1-216-081-00	METAL CHIP	22K	5%	1/10W
R823	1-216-087-00	METAL CHIP	39K	5%	1/10W
R824	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R825	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R826	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R827	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R828	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R829	1-216-075-00	METAL CHIP	12K	5%	1/10W
R830	1-216-097-00	METAL CHIP	100K	5%	1/10W
R831	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R832	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R833	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R834	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R835	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R836	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R837	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R838	1-216-047-00	METAL CHIP	820	5%	1/10W
R839	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R861	1-216-073-00	METAL CHIP	10K	5%	1/10W
R862	1-216-073-00	METAL CHIP	10K	5%	1/10W
R863	1-216-079-00	METAL CHIP	18K	5%	1/10W
R864	1-216-085-00	METAL CHIP	33K	5%	1/10W
R866	1-216-295-00	METAL CHIP	0	5%	1/10W
R867	1-216-053-00	METAL CHIP	1.5K	5%	1/10W

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R868	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
		VARIABLE RESISTOR				
RV801	1-230-870-21	RES, ADJ, METAL GLAZE 10K				
RV802	1-230-870-21	RES, ADJ, METAL GLAZE 10K				
RV803	1-230-870-21	RES, ADJ, METAL GLAZE 10K				
RV804	1-230-870-21	RES, ADJ, METAL GLAZE 10K				
RV805	1-230-870-21	RES, ADJ, METAL GLAZE 10K				
RV806	1-230-870-21	RES, ADJ, METAL GLAZE 10K				
RV807	1-230-870-21	RES, ADJ, METAL GLAZE 10K				
RV808	1-230-870-21	RES, ADJ, METAL GLAZE 10K				
RV809	1-230-870-21	RES, ADJ, METAL GLAZE 10K				
RV810	1-230-870-21	RES, ADJ, METAL GLAZE 10K				
**********						
	*A-7070-425-A	MA-21 BOARD, COMPLETE				
		**********				
		CAPACITOR				
C451	1-124-225-00	ELECT	100MF	20%	6.3V	
C452	1-124-224-00	ELECT	47MF	20%	6.3V	
C453	1-135-072-21	TANTAL. CHIP	0.22MF	20%	35V	
C454	1-124-251-00	ELECT	0.22MF	20%	50V	
C455	1-163-141-00	CERAMIC CHIP	0.001MF	10%	50V	
C456	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V	
		CONNECTOR				
CN451	*1-564-013-00	PIN, CONNECTOR 3P				
		IC				
IC451	8-759-111-56	IC UPC4572G2				
		COIL				
L451	1-410-192-51	INDUCTOR CHIP	1UH			
L452	1-410-192-51	INDUCTOR CHIP	1UH			
L453	1-410-192-51	INDUCTOR CHIP	1UH			
		TRANSISTOR				
Q451	8-729-162-44	TRANSISTOR 2SB624-BV4				
		RESISTOR				
R451	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R452	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R453	1-216-162-00	METAL CHIP	33	5%	1/8W	
R454	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R455	1-216-103-00	METAL CHIP	180K	5%	1/10W	
R456	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R457	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R458	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R459	1-216-087-00	METAL CHIP	39K	5%	1/10W	
R460	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R461	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R462	1-216-001-00	METAL CHIP	10	5%	1/10W	
**********						
		SW-55 BOARD				
		**********				
		CONNECTOR				
CN942	*1-564-012-00	PIN, CONNECTOR 2P				
		SWITCH				
S941	1-570-871-11	SWITCH, SLIDE				
S942	1-570-910-21	SWITCH, TACTIL (REFLOW TYPE)				
S943	1-570-909-21	SWITCH, TACTIL (REFLOW TYPE)				
S944	1-570-910-21	SWITCH, TACTIL (REFLOW TYPE)				
S945	1-570-870-11	SWITCH, SLIDE				
**********						
	*A-7085-002-A	AW-4 BOARD, COMPLETE (AS-15 BOARD)				
		**********				
		CAPACITOR				
C901	1-109-539-00	MICA	150PF	5%	100V	
C902	1-130-475-00	MYLAR	0.0022MF	5%	50V	
C903	1-124-233-00	ELECT	10MF	20%	6.3V	
C904	1-163-077-00	CERAMIC CHIP	0.1MF		50V	
C905	1-124-233-00	ELECT	10MF	20%	6.3V	
C906	1-162-638-11	CERAMIC CHIP	1MF		16V	
C907	1-163-104-00	CERAMIC CHIP	30PF	5%	50V	
C908	1-163-104-00	CERAMIC CHIP	30PF	5%	50V	
C911	1-162-637-11	CERAMIC CHIP	0.47MF		16V	
		CONNECTOR				
CN901	*1-564-004-00	PIN, CONNECTOR 5P				
CN902	*1-564-005-00	PIN, CONNECTOR 6P				
		DIODE				
D901	8-719-100-03	DIODE 1S2835				
		IC				
IC901	8-759-906-53	IC TL062CPS				
IC902	8-759-106-23	IC UPD4066BG				
IC903	8-759-100-93	IC UPC393G2				
IC904	8-759-011-87	IC MC146805F2FP-SC82435				
		TRANSISTOR				
Q901	8-729-903-30	TRANSISTOR DTC144TK				
Q902	8-729-903-30	TRANSISTOR DTC144TK				
Q903	8-729-901-01	TRANSISTOR DTC144EK				
Q904	8-729-901-01	TRANSISTOR DTC144EK				
Q905	8-729-901-01	TRANSISTOR DTC144EK				

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
Q906	8-729-901-01	TRANSISTOR DTC144EK				
Q907	8-729-901-06	TRANSISTOR DTA144EK				
Q908	8-729-901-06	TRANSISTOR DTA144EK				
Q909	8-729-901-06	TRANSISTOR DTA144EK				
Q910	8-729-901-06	TRANSISTOR DTA144EK				
Q911	8-729-901-06	TRANSISTOR DTA144EK				
Q912	8-729-901-01	TRANSISTOR DTC144EK				
		RESISTOR				
R901	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R902	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R903	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R904	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R905	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R906	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R907	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R908	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R909	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R910	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R911	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R912	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R913	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R914	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R915	1-216-103-00	METAL CHIP	180K	5%	1/10W	
R916	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R917	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R918	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R921	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R922	1-216-107-00	METAL CHIP	270K	5%	1/10W	
R923	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R924	1-216-093-00	METAL CHIP	68K	5%	1/10W	
R927	1-216-041-00	METAL CHIP	470	5%	1/10W	
R928	1-216-041-00	METAL CHIP	470	5%	1/10W	
R929	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R930	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R931	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R932	1-216-075-00	METAL CHIP	12K	5%	1/10W	
		VARIABLE RESISTOR				
RV901	1-230-871-21	RES, ADJ, METAL GLAZE 22K				
		CONNECTOR				
W902	*1-506-592-11	PIN, BOARD TO BOARD 4P				
		CRYSTAL				
X901	1-567-192-11	OSCILLATOR, CERAMIC				

****

*A-7070-423-A AS-15 BOARD, COMPLETE
****

3-713-724-01 HOLDER, AS SENSOR

Ref.No	Part No.	Description			Remark
		BALANCE SENSOR			
SB901	1-807-684-11	SENSOR, WHITE BALANCE AM3208SN			

****

*A-7060-767-A MV-12 BOARD, COMPLETE
****

IC201	A-7068-071-A	VY-9 BOARD (HIC), COMPLETE			
		IC			
IC001	8-752-003-00	IC CX20030			
IC202	A-7068-072-A	VD-6 BOARD (HIC), COMPLETE			
		IC			
IC001	8-752-003-10	IC CX20031			
IC203	A-7068-070-A	VC-11 BOARD (HIC), COMPLETE			
		FILTER			
FL001	1-409-419-22	FILTER			
		IC			
IC001	8-752-202-10	IC CX22021			
IC002	8-752-003-20	IC CX20032			
IC003	8-759-202-67	IC CX20117			
IC004	8-759-914-56	IC CX23054			
		MV-12 BOARD			
	1-558-895-11	WIRE, FLAT TYPE 18P			
	1-558-896-11	WIRE, FLAT TYPE 22P			
		CAPACITOR			
C201	1-135-096-21	TANTAL. CHIP 4.7MF	10%	10V	
C202	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C203	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C204	1-163-115-00	CERAMIC CHIP 82PF	5%	50V	
C205	1-163-105-00	CERAMIC CHIP 33PF	5%	50V	
C206	1-163-145-00	CERAMIC CHIP 0.0015MF	5%	50V	
C207	1-163-127-00	CERAMIC CHIP 270PF	5%	50V	
C208	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C209	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V	
C210	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C211	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C212	1-163-095-00	CERAMIC CHIP 12PF	5%	50V	
C213	1-163-105-00	CERAMIC CHIP 33PF	5%	50V	
C214	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C215	1-163-101-00	CERAMIC CHIP 10PF	5%	50V	
C216	1-163-129-00	CERAMIC CHIP 330PF	5%	50V	
C217	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C219	1-163-097-00	CERAMIC CHIP 15PF	5%	50V	
C220	1-163-108-00	CERAMIC CHIP 43PF	5%	50V	
C221	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	

When indicating parts by reference number, please include the board name.

MV-12

Ref.No	Part No.	Description		Remark
C222	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C223	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C224	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C225	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C226	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C227	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C228	1-163-101-00	CERAMIC CHIP 22PF	5%	50V
C229	1-163-145-00	CERAMIC CHIP 0.0015MF	5%	50V
C230	1-163-111-00	CERAMIC CHIP 56PF	5%	50V
C231	1-163-141-00	CERAMIC CHIP 0.001MF	5%	50V
C232	1-163-133-00	CERAMIC CHIP 470PF	5%	50V
C233	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C234	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C235	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C236	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C237	1-124-233-00	ELECT 10MF	20%	16V
C238	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C239	1-131-379-41	TANTALUM 22MF	10%	10V
C240	1-163-245-00	CERAMIC CHIP 56PF	5%	50V
C241	1-124-222-00	ELECT 22MF	20%	6.3V
C242	1-124-222-00	ELECT 22MF	20%	6.3V
C243	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C244	1-135-096-21	TANTAL. CHIP 4.7MF	10%	10V
C245	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C246	1-124-442-00	ELECT 330MF	20%	6.3V
C247	1-135-096-21	TANTAL. CHIP 4.7MF	10%	10V
C248	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C249	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C250	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C251	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C252	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C253	1-163-133-00	CERAMIC CHIP 470PF	5%	50V
C254	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C255	1-163-105-00	CERAMIC CHIP 33PF	5%	50V
C256	1-163-093-00	CERAMIC CHIP 10PF	5%	50V
C257	1-163-093-00	CERAMIC CHIP 22PF	5%	50V
C258	1-163-090-00	CERAMIC CHIP 7PF	0.25PF	50V
C259	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C261	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C262	1-163-117-00	CERAMIC CHIP 330PF	5%	50V
C263	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C264	1-163-125-00	CERAMIC CHIP 220PF	5%	50V
C651	1-124-236-00	ELECT 47MF	20%	16V
C652	1-127-496-00	ELECT(SOLID) 6.8MF	20%	16V
C653	1-163-141-00	CERAMIC CHIP 0.001MF	5%	50V
C654	1-127-489-00	ELECT(SOLID) 10MF	20%	10V
C655	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V
C656	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V
C657	1-127-487-00	ELECT(SOLID) 4.7MF	20%	10V
C658	1-127-504-00	ELECT(SOLID) 0.47MF	20%	25V
C659	1-163-017-00	CERAMIC CHIP 0.0047MF	10%	50V
C660	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C661	1-163-125-00	CERAMIC CHIP 220PF	5%	50V
C662	1-163-015-00	CERAMIC CHIP 0.0033MF	10%	50V
C664	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V
C665	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V
C666	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V

CONNECTOR

CN203	*1-563-584-11	CONNECTOR, FLEXIBLE 7P	
CN204	*1-563-609-11	CONNECTOR, FLEXIBLE 6P	
CN205	*1-564-017-00	PIN, CONNECTOR 7P	
CN206	*1-564-013-00	PIN, CONNECTOR 3P	
CN207	1-562-183-00	SOCKET 8P	

TRIMMER

CV201	1-141-331-11	CAP, VAR, TRIMMER (CHIP) 30P	

DIODE

D201	8-719-101-23	DIODE 1SS123	
D202	8-719-106-43	DIODE RD9.1MB1	
D203	8-719-106-43	DIODE RD9.1MB1	
D204	8-719-106-43	DIODE RD9.1MB1	
D205	8-719-106-43	DIODE RD9.1MB1	
D206	8-719-106-43	DIODE RD9.1MB1	
D207	8-719-101-23	DIODE 1SS123	
D208	8-719-106-43	DIODE RD9.1MB1	
D209	8-719-106-43	DIODE RD9.1MB1	
D651	8-719-200-35	DIODE E10QS03	

DELAY LINE

DL201	1-415-517-21	DELAY LINE, DUAL 1H-2H	

FILTER

FL201	1-235-632-11	BPF	
FL202	1-235-633-11	BPF	
FL203	1-409-394-11	TRAP, CHROMA EMPHASIS	

IC

IC204	8-759-107-89	IC UPD6105G-102	
IC651	8-759-937-36	IC TL1451ACNS	

COIL

L201	1-408-789-21	INDUCTOR CHIP 100UH	
L202	1-408-773-31	INDUCTOR CHIP 4.7UH	
L203	1-408-795-21	INDUCTOR CHIP 330UH	
L204	1-410-167-31	INDUCTOR CHIP 820UH	
L206	1-408-783-00	INDUCTOR CHIP 33UH	
L207	1-410-381-11	INDUCTOR CHIP 10UH	
L210	1-408-970-21	MICRO INDUCTOR 10UH	
L211	1-407-166-XX	MICRO INDUCTOR 56UH	
L213	1-408-970-21	MICRO INDUCTOR 10UH	
L214	1-408-765-21	INDUCTOR CHIP 1UH	
L215	1-408-765-21	INDUCTOR CHIP 1UH	
L216	1-408-982-11	MICRO INDUCTOR 100UH	
L217	1-408-982-11	MICRO INDUCTOR 100UH	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
L218	1-408-982-11	MICRO INDUCTOR 100UH	
L220	1-410-381-11	INDUCTOR CHIP 10UH	
L651	1-421-918-11	COIL, CHOKE 10UH	
L652	1-410-690-11	COIL, CHOKE 22UH	
L653	1-408-773-31	INDUCTOR CHIP 4.7UH	
L654	1-408-788-21	INDUCTOR CHIP 82UH	
L655	1-408-785-21	INDUCTOR CHIP 47UH	
L656	1-408-777-00	INDUCTOR CHIP 10UH	
		VARIABLE COIL	
LV201	1-404-594-11	COIL, VARIABLE (10UH)	
		IC LINK	
PS201⚠	1-532-727-11	LINK, IC (ICP-N5)	
		TRANSISTOR	
Q201	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q202	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q203	8-729-901-01	TRANSISTOR DTC144EK	
Q204	8-729-901-06	TRANSISTOR DTA144EK	
Q205	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q206	8-729-901-01	TRANSISTOR DTC144EK	
Q207	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q208	8-729-901-01	TRANSISTOR DTC144EK	
Q209	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q210	8-729-312-22	TRANSISTOR 2SA1122	
Q211	8-729-901-01	TRANSISTOR DTC144EK	
Q212	8-729-601-58	TRANSISTOR 2SC3053TP-C	
Q213	8-729-901-06	TRANSISTOR DTA144EK	
Q214	8-729-601-58	TRANSISTOR 2SC3053TP-C	
Q215	8-729-601-58	TRANSISTOR 2SC3053TP-C	
Q216	8-729-312-22	TRANSISTOR 2SA1122	
Q217	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q218	8-729-901-06	TRANSISTOR DTA144EK	
Q219	8-729-901-00	TRANSISTOR DTC124EK	
Q220	8-729-117-54	TRANSISTOR 2SA1175	
Q221	8-729-901-01	TRANSISTOR DTC144EK	
Q222	8-729-900-53	TRANSISTOR DTC114EK	
Q223	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q224	8-729-901-01	TRANSISTOR DTC144EK	
Q227	8-729-901-01	TRANSISTOR DTC144EK	
Q228	8-729-901-01	TRANSISTOR DTC144EK	
Q229	8-729-100-76	TRANSISTOR 2SA812	
Q230	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q231	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q232	8-729-901-01	TRANSISTOR DTC144EK	
Q233	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q652	8-729-901-05	TRANSISTOR DTA124EK	
Q653	8-729-805-35	TRANSISTOR 2SB1121-S-TD	
Q654	8-729-901-00	TRANSISTOR DTC124EK	

Ref.No	Part No.	Description				Remark
		RESISTOR				
R201	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R202	1-216-029-00	METAL CHIP	150	5%	1/10W	
R203	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R204	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R205	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R206	1-216-047-00	METAL CHIP	820	5%	1/10W	
R207	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R208	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R209	1-216-041-00	METAL CHIP	470	5%	1/10W	
R210	1-216-027-00	METAL CHIP	120	5%	1/10W	
R211	1-216-035-00	METAL CHIP	270	5%	1/10W	
R212	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R213	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R214	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R215	1-216-041-00	METAL CHIP	470	5%	1/10W	
R216	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R217	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R218	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R219	1-216-039-00	METAL CHIP	390	5%	1/10W	
R220	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R221	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R222	1-216-109-00	METAL CHIP	330K	5%	1/10W	
R223	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R224	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R227	1-216-041-00	METAL CHIP	470	5%	1/10W	
R228	1-216-041-00	METAL CHIP	470	5%	1/10W	
R229	1-216-025-00	METAL CHIP	100	5%	1/10W	
R230	1-216-041-00	METAL CHIP	470	5%	1/10W	
R231	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R232	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R233	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R234	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R235	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R236	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R237	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R238	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R239	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R240	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R241	1-216-039-00	METAL CHIP	390	5%	1/10W	
R242	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R243	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R244	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R245	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R246	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R247	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R248	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R249	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R250	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R251	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R252	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R253	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R254	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R255	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R256	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R257	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R258	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R259	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R260	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R261	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R262	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R263	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R264	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R265	1-216-047-00	METAL CHIP	820	5%	1/10W	
R266	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R267	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R268	1-216-087-00	METAL CHIP	39K	5%	1/10W	
R269	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R270	1-216-017-00	METAL CHIP	47	5%	1/10W	
R271	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	
R272	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R273	1-216-039-00	METAL CHIP	390	5%	1/10W	
R274	1-216-035-00	METAL CHIP	270	5%	1/10W	
R275	1-216-027-00	METAL CHIP	120	5%	1/10W	
R276	1-216-027-00	METAL CHIP	120	5%	1/10W	
R277	1-216-025-00	METAL CHIP	100	5%	1/10W	
R278	1-216-009-00	METAL CHIP	22	5%	1/10W	
R283	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R284	1-216-041-00	METAL CHIP	180	5%	1/10W	
R285	1-216-043-00	METAL CHIP	820	5%	1/10W	
R286	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R287	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R288	1-216-021-00	METAL CHIP	68	5%	1/10W	
R289	1-216-138-00	METAL CHIP	3.3	5%	1/8W	
R290	1-216-066-00	METAL CHIP	5.1K	5%	1/10W	
R291	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R292	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R293	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R294	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R295	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R296	1-216-047-00	METAL CHIP	820	5%	1/10W	
R297	1-216-033-00	METAL CHIP	100	5%	1/10W	
R298	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R299	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R300	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R301	1-216-047-00	METAL CHIP	820	5%	1/10W	
R302	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R303	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R304	1-216-087-00	METAL CHIP	39K	5%	1/10W	
R305	1-216-087-00	METAL CHIP	39K	5%	1/10W	
R306	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R307	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R308	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R309	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	

Ref.No	Part No.	Description				Remark
R311	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R312	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R651	1-216-025-00	METAL CHIP	100	5%	1/10W	
R652	1-216-033-00	METAL CHIP	220	5%	1/10W	
R653	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R654	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R655	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R656	1-216-093-00	METAL CHIP	68K	5%	1/10W	
R657	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R658	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R659	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R660	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R662	1-216-033-00	METAL CHIP	220	5%	1/10W	
R663	1-216-001-00	METAL CHIP	10	5%	1/10W	

VARIABLE RESISTOR

RV201	1-230-868-21	RES, ADJ, METAL GLAZE	2.2K
RV202	1-230-870-21	RES, ADJ, METAL GLAZE	10K
RV203	1-230-868-21	RES, ADJ, METAL GLAZE	2.2K
RV651	1-230-868-21	RES, ADJ, METAL GLAZE	2.2K
RV652	1-230-867-11	RES, ADJ, METAL GLAZE	1K

SWITCH

S201	1-553-977-00	SWITCH, SLIDE

CRYSTAL

X201	1-567-347-11	OSCILLATOR, CERAMIC (13.3MHz)

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*A-7060-790-A	SS-70 BOARD, COMPLETE	
	**********	
1-562-879-11	CONNECTOR, CARD EDGE	19P
1-562-880-11	CONNECTOR, CARD EDGE	15P
*3-674-372-00	HOLDER (A), LED	
3-713-725-01	HOLDER, TOP END SENSOR	

CAPACITOR

C301	1-135-099-00	TANTAL. CHIP	2.2MF	10%	6.3V
C302	1-135-099-00	TANTAL. CHIP	2.2MF	10%	6.3V
C303	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C304	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C305	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C306	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C307	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C308	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C309	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C310	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C313	1-123-616-00	ELECT	4.7MF	20%	25V
C314	1-123-617-00	ELECT	10MF	20%	16V
C315	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C316	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C317	1-135-099-00	TANTAL. CHIP	2.2MF	10%	6.3V

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
C318	1-163-017-00	CERAMIC CHIP 0.0047MF	10%	50V	
C319	1-135-104-00	TANTAL. CHIP 10MF	10%	4V	
C320	1-135-104-00	TANTAL. CHIP 10MF	10%	4V	
C321	1-163-017-00	CERAMIC CHIP 0.0047MF	10%	50V	
C322	1-163-017-00	CERAMIC CHIP 0.0047MF	10%	50V	
C323	1-163-077-00	CERAMIC CHIP 0.1MF		50V	
C324	1-163-077-00	CERAMIC CHIP 0.1MF		50V	
C325	1-135-100-21	TANTAL. CHIP 6.8MF	10%	6.3V	
C326	1-163-131-00	CERAMIC CHIP 390PF	5%	50V	
C327	1-135-099-00	TANTAL. CHIP 2.2MF	10%	6.3V	
C328	1-135-099-00	TANTAL. CHIP 2.2MF	10%	6.3V	
C329	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C501	1-123-612-00	ELECT 2.2MF	20%	50V	
C502	1-123-611-00	ELECT 1MF	20%	50V	
C503	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C504	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C505	1-163-020-00	CERAMIC CHIP 0.0082MF	10%	50V	
C506	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C507	1-163-075-00	CERAMIC CHIP 0.047MF	10%	25V	
C508	1-124-577-11	ELECT 82MF	20%	10V	
C509	1-163-692-11	CERAMIC CHIP 0.0015MF	5%	50V	
C510	1-163-692-11	CERAMIC CHIP 0.0015MF	5%	50V	
C511	1-163-017-00	CERAMIC CHIP 0.0047MF	10%	50V	
C512	1-163-017-00	CERAMIC CHIP 0.0047MF	10%	50V	
C513	1-163-077-00	CERAMIC CHIP 0.1MF		50V	
C514	1-124-271-00	ELECT 1MF	20%	50V	
C515	1-124-287-00	ELECT 10MF	20%	10V	
C516	1-163-033-00	CERAMIC CHIP 0.022MF	10%	25V	
C517	1-163-033-00	CERAMIC CHIP 0.022MF	10%	25V	
C518	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C519	1-124-270-11	ELECT 0.47MF	20%	50V	
C520	1-163-211-00	CERAMIC CHIP 0.0018MF	5%	50V	
C521	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C522	1-123-617-00	ELECT 10MF	20%	16V	
C523	1-124-271-00	ELECT 1MF	20%	50V	
C524	1-163-059-00	CERAMIC CHIP 0.01MF	10%	50V	
C525	1-163-075-00	CERAMIC CHIP 0.047MF	10%	25V	
C526	1-163-033-00	CERAMIC CHIP 0.022MF	10%	25V	
C527	1-163-075-00	CERAMIC CHIP 0.047MF	10%	25V	
C528	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C529	1-124-638-11	ELECT 22MF	20%	10V	
C530	1-163-033-00	CERAMIC CHIP 0.022MF	10%	25V	
C531	1-163-075-00	CERAMIC CHIP 0.047MF	10%	25V	
C532	1-163-145-00	CERAMIC CHIP 0.0015MF	5%	50V	
C533	1-163-139-00	CERAMIC CHIP 820PF	5%	50V	
C534	1-163-033-00	CERAMIC CHIP 0.022MF	10%	25V	
C535	1-127-487-11	ELECT 4.7MF	20%	10V	
C536	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V	
C538	1-163-131-00	CERAMIC CHIP 390PF	5%	50V	
C539	1-124-255-00	ELECT 1MF	20%	50V	
C540	1-124-255-00	ELECT 1MF	20%	50V	
C541	1-124-255-00	ELECT 1MF	20%	50V	
C542	1-124-258-00	ELECT 3.3MF	20%	25V	
C543	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V	
C544	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V	
C545	1-124-233-00	ELECT 10MF	20%	16V	
C546	1-124-233-00	ELECT 10MF	20%	16V	
C547	1-124-233-00	ELECT 10MF	20%	16V	
C548	1-163-133-00	CERAMIC CHIP 470PF	5%	50V	
C549	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C550	1-127-506-00	ELECT(SOLID) 1MF	20%	25V	
C551	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C553	1-124-275-00	ELECT 2.2MF	20%	35V	
C554	1-124-236-00	ELECT 47MF	20%	16V	
C556	1-124-499-11	ELECT 1MF	20%	50V	
C557	1-163-017-00	CERAMIC CHIP 0.0047MF	10%	50V	
C558	1-124-596-11	ELECT 27MF	20%	16V	
C559	1-124-596-11	ELECT 27MF	20%	16V	
C560	1-124-596-11	ELECT 27MF	20%	16V	
C561	1-123-617-00	ELECT 10MF	20%	16V	
C562	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C563	1-163-017-00	CERAMIC CHIP 0.0047MF	10%	50V	
C564	1-124-577-11	ELECT 82MF	20%	10V	
C565	1-124-577-11	ELECT 82MF	20%	10V	
C566	1-163-077-00	CERAMIC CHIP 0.1MF		50V	
C567	1-124-577-11	ELECT 82MF	20%	10V	
C568	1-123-617-00	ELECT 10MF	20%	16V	
C569	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V	
C570	1-163-109-00	CERAMIC CHIP 47PF	5%	50V	
C571	1-163-133-00	CERAMIC CHIP 470PF	5%	50V	
C572	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C573	1-135-096-21	TANTAL. CHIP 4.7MF	20%	10V	
C574	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C575	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C576	1-163-038-00	CERAMIC CHIP 0.1MF		25V	
C577	1-135-096-21	TANTAL. CHIP 4.7MF	20%	10V	

CONNECTOR

CN303	*1-506-979-21	CONNECTOR, BOARD TO BOARD 13P
CN304	*1-563-612-11	CONNECTOR, FLEXIBLE 9P
CN305	*1-564-016-00	PIN, CONNECTOR 6P
CN306	*1-506-979-21	CONNECTOR, BOARD TO BOARD 13P
CN307	*1-564-013-00	PIN, CONNECTOR 3P
CN501	*1-564-014-00	PIN, CONNECTOR 4P
CN502	*1-564-014-00	PIN, CONNECTOR 4P
CN504	*1-564-014-00	PIN, CONNECTOR 4P
CN505	*1-564-015-00	PIN, CONNECTOR 5P

DIODE

D301	8-719-951-12	DIODE HZ5BLL
D302	8-719-100-05	DIODE 1S2837
D305	8-719-100-03	DIODE 1S2835
D308	8-719-801-41	DIODE 1SS196
D501	8-719-101-23	DIODE 1SS123
D502	8-719-101-23	DIODE 1SS123
D503	8-719-200-27	DIODE E10DS2

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description	Remark
D504	8-719-000-12	DIODE MC931	
D505	8-719-200-35	DIODE E10QS03	
D506	8-719-200-35	DIODE E10QS03	
		FILTER	
FL501	1-235-612-21	BPF (16KHz)	
FL502	1-235-611-21	BPF (47KHz)	
		IC	
IC301	8-759-941-69	IC MB88551-5014	
IC302	8-759-100-95	IC UPC324G2	
IC303	8-759-922-54	IC S-81250AG	
IC304	8-759-937-56	IC S-8054ALB-LM	
IC305	8-759-207-00	IC TA7733F	
IC501	8-759-107-68	IC CX20115A	
IC502	8-759-201-80	IC TC4526BF	
IC503	8-752-003-50	IC CX20035	
IC504	8-759-925-66	IC BA6303F	
IC505	8-759-701-36	IC NJM3403AM	
IC506	8-759-201-01	IC TC4066BF	
IC507	8-759-928-56	IC CXA1042M	
IC508	8-752-003-60	IC CX20036	
IC509	8-759-202-45	IC CX20114	
IC510	8-759-803-47	IC LA5005M	
		COIL	
L301	1-407-177-XX	MICRO INDUCTOR 470UH	
L502	1-408-948-00	MICRO INDUCTOR 220UH	
L503	1-410-627-11	COIL, CHOKE 100UH	
L504	1-410-628-11	COIL, CHOKE 200UH	
L505	1-410-628-11	COIL, CHOKE 200UH	
L506	1-408-987-21	MICRO INDUCTOR 330UH	
		IC LINK	
PS301⚠	1-532-685-11	LINK, IC (ICP-N20)	
PS501⚠	1-532-637-11	LINK, IC (ICP-N25)	
		TRANSISTOR	
Q301	8-729-100-76	TRANSISTOR 2SA812	
Q302	8-729-100-76	TRANSISTOR 2SA812	
Q303	8-729-100-76	TRANSISTOR 2SA812	
Q306	8-729-903-10	TRANSISTOR FMW1	
Q307	8-729-901-01	TRANSISTOR DTC144EK	
Q308	8-729-100-76	TRANSISTOR 2SA812	
Q309	8-729-901-47	TRANSISTOR DTA143EK	
Q310	8-729-900-53	TRANSISTOR DTC114EK	
Q311	8-729-901-07	TRANSISTOR DTA124XK	
Q312	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q313	8-729-902-96	TRANSISTOR FMS1	
Q314	8-729-903-82	TRANSISTOR FMW2	
Q315	8-729-104-95	TRANSISTOR 2SB1040A-5	
Q316	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q317	8-729-901-06	TRANSISTOR DTA144EK	
Q318	8-729-904-20	TRANSISTOR FMA2	
Q319	8-729-805-25	TRANSISTOR 2SB1121	
Q320	8-729-805-25	TRANSISTOR 2SB1121	
Q321	8-729-904-20	TRANSISTOR FMA2	
Q322	8-729-901-06	TRANSISTOR DTA144EK	
Q323	8-729-903-10	TRANSISTOR FMW1	
Q324	8-729-901-01	TRANSISTOR DTC144EK	
Q325	8-729-901-01	TRANSISTOR DTC144EK	
Q326	8-729-700-10	NJL7141E-S	
Q327	8-729-700-10	NJL7141E-S	
Q328	8-729-900-53	TRANSISTOR DTC114EK	
Q501	8-729-901-01	TRANSISTOR DTC144EK	
Q502	8-729-100-76	TRANSISTOR 2SA812	
Q503	8-729-100-67	TRANSISTOR 2SC1623-T7	
Q504	8-729-904-20	TRANSISTOR FMA2	
Q505	8-729-100-76	TRANSISTOR 2SA812	
Q506	8-729-901-01	TRANSISTOR DTC144EK	
Q507	8-729-901-06	TRANSISTOR DTA144EK	
Q508	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q509	8-729-100-76	TRANSISTOR 2SA812	
Q510	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q511	8-729-100-76	TRANSISTOR 2SA812	
Q512	8-729-100-76	TRANSISTOR 2SA812	
Q513	8-729-904-20	TRANSISTOR FMA2	
Q514	8-729-901-06	TRANSISTOR DTA144EK	
Q515	8-729-904-20	TRANSISTOR FMA2	
Q516	8-729-100-66	TRANSISTOR 2SC1623	
Q517	8-729-100-76	TRANSISTOR 2SA812	
Q518	8-729-100-66	TRANSISTOR 2SC1623	
Q519	8-729-100-76	TRANSISTOR 2SA812	
Q520	8-729-100-66	TRANSISTOR 2SC1623	
Q521	8-729-100-76	TRANSISTOR 2SA812	
Q522	8-729-903-29	TRANSISTOR DTA144TK	
Q524	8-729-805-25	TRANSISTOR 2SB1121	
Q525	8-729-805-25	TRANSISTOR 2SB1121	
Q526	8-729-803-37	TRANSISTOR 2SA1237	
Q527	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q528	8-729-903-30	TRANSISTOR DTC144TK	
Q529	8-729-903-29	TRANSISTOR DTA144TK	
Q530	8-729-162-44	TRANSISTOR 2SB624-BV4	
Q531	8-729-901-01	TRANSISTOR DTC144EK	
Q532	8-729-901-01	TRANSISTOR DTC144EK	
		RESISTOR	
R301	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R302	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R303	1-216-111-00	METAL CHIP 390K 5% 1/10W	
R304	1-216-111-00	METAL CHIP 390K 5% 1/10W	
R305	1-216-111-00	METAL CHIP 390K 5% 1/10W	
R306	1-216-111-00	METAL CHIP 390K 5% 1/10W	
R307	1-216-087-00	METAL CHIP 39K 5% 1/10W	
R308	1-216-087-00	METAL CHIP 39K 5% 1/10W	
R309	1-216-087-00	METAL CHIP 39K 5% 1/10W	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R310	1-216-087-00	METAL CHIP	39K	5%	1/10W	
R311	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R312	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R313	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R314	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R315	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R316	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R317	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R318	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R319	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R320	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R321	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R322	1-216-043-00	METAL CHIP	560	5%	1/10W	
R323	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R324	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R325	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R326	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R327	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R328	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R329	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R330	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R331	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R332	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R333	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R334	1-216-109-00	METAL CHIP	330K	5%	1/10W	
R335	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R336	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R337	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R338	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R339	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R340	1-216-172-00	METAL CHIP	82	5%	1/8W	
R341	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R342	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R343	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R344	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R345	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R346	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R347	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R348	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R349	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R350	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R351	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R352	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R353	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R354	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R355	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R356	1-216-196-00	METAL CHIP	820	5%	1/8W	
R357	1-216-196-00	METAL CHIP	820	5%	1/8W	
R358	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R358	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R359	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R360	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R361	1-216-083-00	METAL CHIP	27K	5%	1/10W	

Ref.No	Part No.	Description				Remark
R362	1-216-109-00	METAL CHIP	330K	5%	1/10W	
R363	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R364	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R365	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R366	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R367	1-216-194-00	METAL CHIP	680	5%	1/8W	
R368	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R369	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R370	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R371	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R372	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R373	1-216-194-00	METAL CHIP	680	5%	1/8W	
R374	1-216-194-00	METAL CHIP	680	5%	1/8W	
R375	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R376	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R377	1-216-196-00	METAL CHIP	820	5%	1/8W	
R378	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R379	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R380	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R381	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R382	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R383	1-216-166-00	METAL CHIP	47	5%	1/8W	
R384	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R386	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R387	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R389	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R390	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R391	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R392	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R393	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R394	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R395	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R396	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R397	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R398	1-216-107-00	METAL CHIP	270K	5%	1/10W	
R399	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R501	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R502	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R503	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R504	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R505	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R506	1-216-109-00	METAL CHIP	330K	5%	1/10W	
R507	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R508	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R509	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R510	1-216-117-00	METAL CHIP	680K	5%	1/10W	
R511	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R512	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R514	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R515	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R516	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R517	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R518	1-216-073-00	METAL CHIP	10K	5%	1/10W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R519	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R520	1-216-117-00	METAL CHIP	680K	5%	1/10W	
R521	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R522	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R523	1-216-109-00	METAL CHIP	330K	5%	1/10W	
R524	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R525	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R526	1-216-043-00	METAL CHIP	560	5%	1/10W	
R527	1-216-107-00	METAL CHIP	270K	5%	1/10W	
R529	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R530	1-216-107-00	METAL CHIP	270K	5%	1/10W	
R531	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R532	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R533	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R534	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R535	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R537	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R538	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R539	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R540	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R541	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R542	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R543	1-216-047-00	METAL CHIP	820	5%	1/10W	
R544	1-216-039-00	METAL CHIP	390	5%	1/10W	
R546	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R548	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R549	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R550	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R551	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R552	1-216-087-00	METAL CHIP	39K	5%	1/10W	
R553	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R554	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R555	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R556	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R557	1-216-103-00	METAL CHIP	180K	5%	1/10W	
R559	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R560	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R561	1-216-117-00	METAL CHIP	680K	5%	1/10W	
R562	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R563	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R564	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R565	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R569	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R570	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R571	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R572	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R573	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R575	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R576	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R577	1-216-041-00	METAL CHIP	470	5%	1/10W	
R578	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R579	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R580	1-216-089-00	METAL CHIP	47K	5%	1/10W	

Ref.No	Part No.	Description				Remark
R581	1-216-025-00	METAL CHIP	100	5%	1/10W	
R582	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R583	1-216-087-00	METAL CHIP	39K	5%	1/10W	
R584	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R585	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R586	1-216-047-00	METAL CHIP	820	5%	1/10W	
R587	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R589	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R590	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R591	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R592	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R593	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R594	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	
R595	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R596	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R597	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R598	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R599	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R600	1-214-972-00	METAL	0.22	5%	1/4W	
R601	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R602	1-216-304-11	METAL CHIP	3.3	5%	1/10W	
R603	1-216-304-11	METAL CHIP	3.3	5%	1/10W	
R604	1-216-304-11	METAL CHIP	3.3	5%	1/10W	
R605	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R606	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R607	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R608	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R609	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R610	1-216-041-00	METAL CHIP	470	5%	1/10W	
R611	1-216-041-00	METAL CHIP	470	5%	1/10W	
R612	1-216-025-00	METAL CHIP	100	5%	1/10W	
R613	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R613	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R614	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R615	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R617	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R618	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R620	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R621	1-216-214-00	METAL CHIP	4.7K	5%	1/8W	
R622	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R623	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R624	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R629	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R630	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R633	1-216-025-00	METAL CHIP	100	5%	1/10W	
R634	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R635	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R636	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R637	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R638	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R639	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R640	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R641	1-216-073-00	METAL CHIP	10K	5%	1/10W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R642	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R643	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R644	1-216-278-00	METAL CHIP	2.2M	5%	1/8W	
		VARIABLE RESISTOR				
RV502	1-230-873-11	RES, ADJ, METAL GLAZE 47K				
		JUMPER WIRE				
W301	1-535-639-11	WIRE, JUMPER (10 CORE)				
		CRYSTAL				
X301	1-567-143-00	OSCILLATOR, CERAMIC (6MHz)				
**********						
	*A-7060-772-A	MR-8 BOARD, COMPLETE **********				
	*A-7068-074-A	RP-34 BOARD (HIC), COMPLETE				
		IC				
IC001	8-752-003-40	IC CX20034				
		MR-8 BOARD				
		CAPACITOR				
C101	1-163-117-00	CERAMIC CHIP	100PF	5%	50V	
C102	1-163-121-00	CERAMIC CHIP	150PF	5%	50V	
C103	1-163-117-00	CERAMIC CHIP	100PF	5%	50V	
C104	1-163-117-00	CERAMIC CHIP	100PF	5%	50V	
C105	1-163-038-00	CERAMIC CHIP	0.1MF		25V	
C108	1-124-222-00	ELECT	22MF	20%	6.3V	
C110	1-127-494-00	ELECT(SOLID)	3.3MF	20%	16V	
C111	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V	
C112	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V	
C151	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V	
		CONNECTOR				
CN101	*1-564-016-00	PIN, CONNECTOR 6P				
CN102	*1-564-013-00	PIN, CONNECTOR 3P				
CN105	*1-564-003-00	PIN, CONNECTOR 4P				
		DIODE				
D153	8-719-812-42	DIODE TLY124				
D154	8-719-812-41	DIODE TLR124				
		COIL				
L101	1-408-777-00	INDUCTOR CHIP	10UH			
L102	1-408-948-00	MICRO INDUCTOR	220UH			
		TRANSISTOR				
Q102	8-729-117-54	TRANSISTOR 2SA1175				
Q103	8-729-100-76	TRANSISTOR 2SA812				
Q151	8-729-901-06	TRANSISTOR DTA144EK				
		RESISTOR				
R103	1-216-009-00	METAL CHIP	22	5%	1/10W	
R104	1-216-037-00	METAL CHIP	330	5%	1/10W	
R105	1-216-041-00	METAL CHIP	470	5%	1/10W	
R106	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R107	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R108	1-216-025-00	METAL CHIP	100	5%	1/10W	
R109	1-216-043-00	METAL CHIP	560	5%	1/10W	
R151	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R152	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R153	1-216-093-00	METAL CHIP	68K	5%	1/10W	
R154	1-216-095-00	METAL CHIP	82K	5%	1/10W	
		VARIABLE RESISTOR				
RV151	1-230-870-21	RES, ADJ, METAL GLAZE 10K				
RV152	1-230-875-21	RES, ADJ, METAL GLAZE 220K				
RV153	1-230-875-21	RES, ADJ, METAL GLAZE 220K				
RV155	1-230-875-21	RES, ADJ, METAL GLAZE 220K				
RV156	1-230-873-11	RES, ADJ, METAL GLAZE 47K				
		SWITCH				
S101	1-554-364-00	SWITCH, SLIDE				
**********						
	*A-7060-771-A	AU-31 BOARD, COMPLETE **********				
		CAPACITOR				
C401	1-163-141-00	CERAMIC CHIP	0.001MF	10%	50V	
C402	1-135-083-00	TANTAL. CHIP	0.47MF	20%	25V	
C403	1-163-133-00	CERAMIC CHIP	470PF	5%	50V	
C404	1-124-255-00	ELECT	1MF	20%	50V	
C405	1-135-070-00	TANTAL. CHIP	0.1MF	20%	35V	
C406	1-124-229-00	ELECT	33MF	20%	6.3V	
C407	1-163-145-00	CERAMIC CHIP	0.0015MF	10%	50V	
C408	1-163-123-00	CERAMIC CHIP	180PF	5%	50V	
C409	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V	
C410	1-163-014-00	CERAMIC CHIP	0.0027MF	10%	50V	
C411	1-135-099-00	TANTAL. CHIP	2.2MF	20%	6.3V	
C412	1-135-104-00	TANTAL. CHIP	10MF	20%	4V	
C413	1-163-020-00	CERAMIC CHIP	0.0082MF	10%	50V	
C414	1-163-137-00	CERAMIC CHIP	680PF	5%	50V	
C415	1-135-104-00	TANTAL. CHIP	10MF	20%	4V	
C416	1-135-091-00	TANTAL. CHIP	1MF	20%	16V	
C417	1-163-125-00	CERAMIC CHIP	220PF	10%	50V	
C418	1-162-587-91	CERAMIC CHIP	0.039MF	10%	25V	
C419	1-163-088-00	CERAMIC CHIP	5PF	0.25PF	50V	
C420	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V	

When indicating parts by reference number, please include the board name.

AU-31 FP-53 AF-29

Ref.No	Part No.	Description			Remark
C421	1-135-104-00	TANTAL. CHIP	10MF	20%	4V
C423	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C424	1-124-225-00	ELECT	100MF	20%	6.3V
C425	1-124-225-00	ELECT	100MF	20%	6.3V
C426	1-124-225-00	ELECT	100MF	20%	6.3V
C427	1-163-019-00	CERAMIC CHIP	0.0068MF	10%	50V
C428	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C429	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C430	1-163-123-00	CERAMIC CHIP	180PF	5%	50V
C431	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C432	1-135-083-00	TANTAL. CHIP	0.47MF	20%	25V
C433	1-163-123-00	CERAMIC CHIP	180PF	5%	50V
C434	1-163-014-00	CERAMIC CHIP	0.0027MF	10%	50V
C435	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C436	1-135-104-00	TANTAL. CHIP	10MF	20%	4V
C437	1-163-133-00	CERAMIC CHIP	470PF	10%	50V
C438	1-135-104-00	TANTAL. CHIP	10MF	20%	4V
C439	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C440	1-135-104-00	TANTAL. CHIP	10MF	20%	4V

FILTER

FL401	1-235-398-11	BPF (1.5MHz)

IC

IC401	8-752-003-79	IC CX20037A

COIL

L401	1-408-793-21	INDUCTOR CHIP 220UH

TRANSISTOR

Q403	8-729-100-67	TRANSISTOR 2SC1623-L7
Q404	8-729-100-67	TRANSISTOR 2SC1623-L7
Q405	8-729-100-76	TRANSISTOR 2SA812
Q406	8-729-100-67	TRANSISTOR 2SC1623-L7

RESISTOR

R401	1-216-085-00	METAL CHIP	33K	5%	1/10W
R402	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R403	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R404	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R405	1-216-073-00	METAL CHIP	10K	5%	1/10W
R406	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R407	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R408	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R409	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R410	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R411	1-216-045-00	METAL CHIP	680	5%	1/10W
R412	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R413	1-216-075-00	METAL CHIP	12K	5%	1/10W
R414	1-216-079-00	METAL CHIP	18K	5%	1/10W
R417	1-216-083-00	METAL CHIP	27K	5%	1/10W
R418	1-216-077-00	METAL CHIP	15K	5%	1/10W
R419	1-247-829-00	CARBON	820	5%	1/6W
R420	1-216-047-00	METAL CHIP	820	5%	1/10W
R421	1-216-079-00	METAL CHIP	18K	5%	1/10W
R422	1-216-049-00	METAL CHIP	1K	5%	1/10W
R423	1-216-049-00	METAL CHIP	1K	5%	1/10W
R424	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R425	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R426	1-216-060-00	METAL CHIP	3K	5%	1/10W
R427	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R428	1-216-089-00	METAL CHIP	47K	5%	1/10W
R429	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R430	1-216-085-00	METAL CHIP	33K	5%	1/10W
R431	1-216-085-00	METAL CHIP	33K	5%	1/10W
R432	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R433	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R434	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R435	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R436	1-216-041-00	METAL CHIP	470	5%	1/10W
R437	1-216-043-00	METAL CHIP	560	5%	1/10W
R438	1-216-025-00	METAL CHIP	100	5%	1/10W
R439	1-216-081-00	METAL CHIP	22K	5%	1/10W
R440	1-216-055-00	METAL CHIP	1.8K	5%	1/10W

VARIABLE RESISTOR

RV401	1-230-870-21	RES, ADJ, METAL GLAZE 10K
RV402	1-230-871-21	RES, ADJ, METAL GLAZE 22K

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	A-7060-693-A	FP-53 BOARD, COMPLETE
		**********
	3-713-904-01	HOLDER (2), LED

DIODE

D302	8-719-928-24	DIODE EE-L106
D303	8-719-801-55	TLP907-0
D304	8-719-801-55	TLP907-0

SWITCH

S301	1-570-869-11	SWITCH, PUSH (2 KEY) (TAPE SELECT, C IN)

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	*A-7070-406-A	AF-29 BOARD, COMPLETE
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CAPACITOR

C015	1-163-275-00	CERAMIC CHIP	0.001MF	5%	50V
C016	1-163-275-00	CERAMIC CHIP	0.001MF	5%	50V
C017	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C018	1-124-255-00	ELECT	1MF	20%	50V
C019	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
C020	1-124-233-00	ELECT	10MF	20%	16V
C021	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C022	1-163-275-00	CERAMIC CHIP	0.001MF	5%	50V
C023	1-163-275-00	CERAMIC CHIP	0.001MF	5%	50V
C024	1-124-233-00	ELECT	10MF	20%	16V
C025	1-124-444-00	ELECT	220MF	20%	10V
C026	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C027	1-124-444-00	ELECT	220MF	20%	10V
C028	1-124-229-00	ELECT	33MF	20%	10V
C029	1-163-104-00	CERAMIC CHIP	30PF	5%	50V
C030	1-163-104-00	CERAMIC CHIP	30PF	5%	50V
		DIODE			
D002	8-719-815-55	DIODE 1S1555			
D003	8-719-815-55	DIODE 1S1555			
D004	8-719-815-55	DIODE 1S1555			
D005	8-719-815-55	DIODE 1S1555			
		IC			
IC002	9-991-184-01	IC RF5L01			
IC003	9-999-855-01	IC LAG648			
IC005	8-759-701-01	IC NJM2904M			
		IC LINK			
PS001	⚠1-532-727-11	LINK, IC (ICP-N5)			
		TRANSISTOR			
Q001	8-729-103-16	TRANSISTOR 2SC1622A			
Q002	8-729-199-92	TRANSISTOR 2SD999			
Q003	8-729-103-16	TRANSISTOR 2SC1622A			
Q004	8-729-103-16	TRANSISTOR 2SC1622A			
Q005	8-729-199-92	TRANSISTOR 2SD999			
		RESISTOR			
R019	1-216-049-00	METAL CHIP	1K	5%	1/10W
R020	1-216-049-00	METAL CHIP	1K	5%	1/10W
R022	1-216-089-00	METAL CHIP	47K	5%	1/10W
R023	1-216-052-00	METAL CHIP	1.3K	5%	1/10W
R024	1-216-093-00	METAL CHIP	68K	5%	1/10W
R025	1-216-083-00	METAL CHIP	27K	5%	1/10W
R026	1-216-089-00	METAL CHIP	47K	5%	1/10W
R027	1-216-308-00	METAL CHIP	4.7	5%	1/10W
R028	1-216-029-00	METAL CHIP	150	5%	1/10W
R029	1-246-422-00	CARBON	7.5	5%	1/4W
R030	1-216-042-00	METAL CHIP	510	5%	1/10W
R031	1-247-729-11	CARBON	15	5%	1/2W
R032	1-216-091-00	METAL CHIP	56K	5%	1/10W
R033	1-216-097-00	METAL CHIP	100K	5%	1/10W
R034	1-216-115-00	METAL CHIP	560K	5%	1/10W
R035	1-216-073-00	METAL CHIP	10K	5%	1/10W
R038	1-216-073-00	METAL CHIP	10K	5%	1/10W

Ref.No	Part No.	Description			Remark
		VARIABLE RESISTOR			
VR001	1-230-527-11	RES, ADJ, METAL GLAZE 100K			
VR002	1-230-527-11	RES, ADJ, METAL GLAZE 100K			
VR003	1-230-522-11	RES, ADJ, METAL GLAZE 4.7K			
		CRYSTAL			
X001	1-567-143-00	OSCILLATOR, CERAMIC			
**********					
	*A-7070-407-A	AF-30 BOARD, COMPLETE			
		**********			
	*3-707-277-02	CASE, SHIELD (1)			
	*3-707-282-02	CASE, SHIELD (2)			
		CAPACITOR			
C003	1-163-093-00	CERAMIC CHIP	10PF	5%	50V
C004	1-163-093-00	CERAMIC CHIP	10PF	5%	50V
C005	1-163-081-00	CERAMIC CHIP	0.22MF		25V
C006	1-163-081-00	CERAMIC CHIP	0.22MF		25V
C007	1-124-234-00	ELECT	22MF	20%	16V
C008	1-124-233-00	ELECT	10MF	20%	16V
C009	1-124-233-00	ELECT	10MF	20%	16V
C010	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C011	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C012	1-124-233-00	ELECT	10MF	20%	16V
C013	1-124-255-00	ELECT	1MF	20%	50V
C014	1-124-257-00	ELECT	2.2MF	20%	50V
		DIODE			
D001	8-719-815-55	DIODE 1S1555			
		IC			
IC001	9-991-183-01	IC HY9104			
IC004	8-759-700-90	IC NJM2901M			
		RESISTOR			
R001	1-216-121-00	METAL CHIP	1M	5%	1/10W
R002	1-216-121-00	METAL CHIP	1M	5%	1/10W
R003	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R004	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R005	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R006	1-216-097-00	METAL CHIP	100K	5%	1/10W
R007	1-216-081-00	METAL CHIP	22K	5%	1/10W
R008	1-216-081-00	METAL CHIP	22K	5%	1/10W
R009	1-216-085-00	METAL CHIP	33K	5%	1/10W
R010	1-216-042-00	METAL CHIP	510	5%	1/10W
R011	1-216-039-00	METAL CHIP	390	5%	1/10W
R012	1-216-088-00	METAL CHIP	43K	5%	1/10W
R013	1-216-081-00	METAL CHIP	22K	5%	1/10W
R014	1-216-043-00	METAL CHIP	560	5%	1/10W

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

AF-30 MJ-12 FP-49 SK-15 FH-8 RC-21 TA-48 VF-10

Ref.No	Part No.	Description				Remark
R015	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R016	1-216-093-00	METAL CHIP	68K	5%	1/10W	
R017	1-216-070-00	METAL CHIP	7.5K	5%	1/10W	
R018	1-216-047-00	METAL CHIP	820	5%	1/10W	
R021	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R026	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R039	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R040	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	

****

A-7070-426-A MJ-12 BOARD, COMPLETE
****

CAPACITOR

C471	1-163-035-00	CERAMIC CHIP 0.047MF		50V

CONNECTOR

CN471	*1-564-014-00	PIN, CONNECTOR 4P

DIODE

D471	8-719-911-19	DIODE 1SS119

JACK

J471	1-507-921-00	JACK (MIC)
J472	1-563-454-11	JACK, MINIATURE (DC OUT)

****

1-620-629-11 FP-49 BOARD, FLEXIBLE
****

1-537-005-21	JACK BOARD
*3-713-984-01	TAPE, COPPER FOIL

****

1-620-630-12 SK-15 BOARD, FLEXIBLE
****

SWITCH

S351	1-570-773-21	SWITCH, SLIDER
S352	1-554-371-31	SWITCH, TACT
S353	1-554-371-31	SWITCH, TACT
S354	1-554-371-31	SWITCH, TACT
S355	1-554-371-31	SWITCH, TACT
S356	1-554-371-31	SWITCH, TACT

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*1-620-825-21 FH-8 BOARD
****

CAPACITOR

C681	1-123-321-00	ELECT	220MF	20%	16V

Ref.No	Part No.	Description	Remark

COIL

L681	1-410-337-11	MICRO INDUCTOR 1UH
L682	1-410-337-11	MICRO INDUCTOR 1UH
L683	1-410-337-11	MICRO INDUCTOR 1UH
L684	1-410-337-11	MICRO INDUCTOR 1UH

IC LINK

PS901⚠	1-532-840-21	LINK, IC (1.25A)
PS902⚠	1-532-840-21	LINK, IC (1.25A)
PS903⚠	1-532-840-21	LINK, IC (1.25A)

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1-620-827-21 RC-21 BOARD
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DIODE

D681	8-719-100-68	DIODE RD13EB2
D682	8-719-100-68	DIODE RD13EB2

SWITCH

S681	1-570-689-11	SWITCH, KEY BOARD
S682	1-553-977-41	SWITCH, SLIDE

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*1-620-941-11 TA-48 BOARD
****

1-566-219-12 PLUG (TERMINAL BOARD A)

****

*A-7060-777-A VF-10 BOARD, COMPLETE (LD-7 BOARD)
****

CAPACITOR

C951	1-124-222-00	ELECT	22MF	20%	6.3V
C952	1-163-081-00	CERAMIC CHIP	0.22MF		25V
C953	1-136-175-00	FILM	0.68MF	5%	50V
C954	1-124-584-00	ELECT	100MF	20%	10V
C955	1-163-007-00	CERAMIC CHIP	680PF	10%	50V
C956	1-162-637-11	CERAMIC CHIP	0.47MF		16V
C957	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C958	1-124-233-00	ELECT	10MF	20%	10V
C959	1-163-209-00	CERAMIC CHIP	0.0015MF	5%	50V
C960	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C961	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C963	1-124-442-00	ELECT	330MF	20%	6.3V
C964	1-124-587-11	ELECT	220MF	20%	6.3V
C965	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C966	1-163-023-00	CERAMIC CHIP	0.015MF	10%	50V
C967	1-124-255-00	ELECT	1MF	20%	50V
C968	1-163-141-00	CERAMIC CHIP	0.001MF	10%	50V
C969	1-163-013-00	CERAMIC CHIP	0.0022MF	10%	50V

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
C971	⚠1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C972	⚠1-163-013-00	CERAMIC CHIP	0.0022MF	10%	50V
C973	1-124-971-11	ELECT	3.3MF	20%	63V
C974	1-162-697-11	CERAMIC	0.001MF	20%	1.5KV
C975	1-102-038-00	CERAMIC	0.001MF	99%	500V
C976	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C977	1-131-388-00	TANTALUM	68MF	10%	6.3V
		CONNECTOR			
CN951	*1-566-164-11	PIN, CONNECTOR 2P			
CN952	*1-564-001-11	PIN, CONNECTOR 2P			
CN953	*1-564-001-11	PIN, CONNECTOR 2P			
CN954	*1-566-164-21	PIN, CONNECTOR 2P			
CN955	*1-564-001-11	PIN, CONNECTOR 2P			
		DIODE			
D951	8-719-400-20	DIODE MA152WA			
D952	8-719-801-48	DIODE 1SS193			
D953	8-719-801-45	DIODE 1SS187			
		IC			
IC951	8-759-403-49	IC AN2510S			
		COIL			
L951	⚠1-408-980-41	MICRO INDUCTOR 68UH			
L952	⚠1-459-683-11	COIL, FERRITE (HLC)			
L953	1-408-978-21	MICRO INDUCTOR 47UH			
		IC LINK			
PS951	⚠1-532-933-11	LINK, IC (PSM250)			
		TRANSISTOR			
Q951	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q952	8-729-162-44	TRANSISTOR 2SB624-BV4			
Q953	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q954	8-729-106-68	TRANSISTOR 2SD1615A-GP			
		RESISTOR			
R951	1-216-306-11	METAL CHIP	3.9	5%	1/10W
R952	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R953	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R954	1-216-671-11	METAL CHIP	6.8K	0.50%	1/16W
R955	1-216-101-00	METAL CHIP	150K	5%	1/10W
R956	1-216-017-00	METAL CHIP	47	5%	1/10W
R957	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R958	1-216-093-00	METAL CHIP	68K	5%	1/10W
R959	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R960	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R961	1-216-226-00	METAL CHIP	15K	5%	1/8W
R962	1-216-121-00	METAL CHIP	1M	5%	1/10W
R963	1-216-295-00	METAL CHIP	0	5%	1/10W
R964	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R965	1-216-041-00	METAL CHIP	470	5%	1/10W
R966	⚠1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R967	1-216-073-00	METAL CHIP	10K	5%	1/10W
R968	⚠1-216-073-00	METAL CHIP	10K	5%	1/10W
R970	1-216-125-00	METAL CHIP	1.5M	5%	1/10W
R971	1-216-130-11	METAL CHIP	2.4M	5%	1/10W
R972	1-216-119-00	METAL CHIP	820K	5%	1/10W
R973	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R974	1-216-049-00	METAL CHIP	1K	5%	1/10W
R976	1-216-121-00	METAL CHIP	1M	5%	1/10W
R977	1-216-041-00	METAL CHIP	470	5%	1/10W
		VARIABLE RESISTOR			
RV951	1-237-431-11	RES, ADJ, CARBON 220			
RV952	1-228-920-00	RES, ADJ, CARBON 2.2K			
RV953	1-230-497-11	RES, ADJ, CARBON 22K			
RV954	1-230-203-00	RES, ADJ, METAL GLAZE 2.2M			
RV955	1-230-203-00	RES, ADJ, METAL GLAZE 2.2M			
		TRANSFORMER			
T951	⚠1-439-396-11	TRANSFORMER ASSY, FLYBACK (FBT)			

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*1-621-803-11 LD-7 BOARD

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		DIODE			
D954	8-719-801-26	DIODE TLR223			

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		MISCELLANOEUS			
		**********			
	1-535-574-11	TERMINAL, SHAFT GROUND			
	1-807-238-11	SENSOR, DEW CONDENSATION			
	1-547-228-11	LENS, ZOOM (VC-1225 YA)			
	1-570-999-11	SWITCH, LEAF (FOCUS LIMIT)			
	1-464-726-11	CONVERTER UNIT, DC-DC			
	1-542-087-12	MICROPHONE, ELECTRET CONDENSER			
	1-563-653-21	SOCKET (TERMINAL BOARD B) 7P			
	1-556-824-61	CORD, CONNECTION (WITH PLUG)8P			
L901	⚠1-451-296-21	DEFLECTION YOKE(BLACK & WHITE) (DY)			
C901	1-161-032-00	CAP, CERAMIC 0.01MF X			
M902	8-835-223-01	MOTOR, DC BHF-3301B (CAPSTAN)			
M903	8-835-222-01	MOTOR, DC LA14-323F (LOADING)			
M904	*8-835-219-01	MOTOR, DC DNR-6303A (FOCUS)			
M905	3-707-279-01	METER ASSY, EE (IRIS)			
S902	1-553-226-00	SWITCH, LEAF (CC DOWN)			
V901	⚠1-546-061-11	CATHODE-RAY TUBE, B/W			

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

ACCESSORIES AND PACKING MATERIALS

****

Part No.	Description	Remark
3-712-595-11	BELT, SHOULDER	
3-765-660-11	MANUAL, INSTRUCTION (ENGLISH: AEP/E/AS/UK MODEL)	
3-765-660-41	MANUAL, INSTRUCTION (FRENCH, GERMAN, DUTCH: E/AEP MODEL)	
3-765-660-51	MANUAL, INSTRUCTION (SPANISH, SWDISH, ITALIAN: E/AEP MODEL)	
3-765-660-61	MANUAL, INSTRUCTION (ARABIC: E MODEL)	
*3-712-179-01	CUSHION (UPPER)	
*3-712-180-01	CUSHION (LOWER)	
A-6767-226-A	MODULATOR ASSY (AEP/E MODEL)	
A-6767-227-A	MODULATOR ASSY (UK MODEL)	
A-6767-348-A	MODULATOR ASSY (AS MODEL)	
*3-713-910-31	CARTON, OUTER (AEP BLACK/UK/E MODEL)	
*3-713-910-41	CARTON, OUTER (AEP SILVER MODEL)	
*3-713-910-51	CARTON, OUTER (AS MODEL)	

When indicating parts by reference number, please include the board name.

SECTION 7
CAMERA SECTION ADJUSTMENT

During the adjustment see the parts location diagram relevant to the adjustment on page 216.

PREPARATION BEFORE ADJUSTMENT (CAMERA SECTION)

7-1. LIST OF SERVICING JIGS

●Oscilloscope ●AC pack ●Screwdriver ●L wrench ●Stop watch ●Color monitor TV ●Vectorscope

Ref No.	Name	Part Code	Use
J-1	Filter (W14)	J-6080-830-A	R gain and B gain adjustment
	Filter (C22)	J-6080-829-A	R gain and B gain adjustment
	Filter (for fine weather)	J-6080-058-A	Outdoor white balance adjustment
J-2	ND filter 0.4	J-6080-806-A	IRIS set adjustment, MAX gain adjustment, LLA adjustment
	ND filter 0.1	J-6080-807-A	IRIS set adjustment, LLA adjustment
	ND filter 0.9	J-6080-833-A	MAX gain adjustment, LLA adjustment (use 2 pc.)
J-3	Pattern box PTB-500*1	J-6029-140-A	
J-4	Pattern box color chart	J-6020-250-A	
J-5 ⓐ	Flat cable C (flexible cable of 7P)	J-6080-874-A	
J-5 ⓑ	Extension board	J-6080-868-A	
J-6	Extension cable (7P)	J-6080-869-A	
	Extension cable (5P)	J-6080-870-A	
	Extension cable (4P)	J-6080-871-A	
	Extension cable (3P)	J-6080-872-A	
	Extension cable (2P)	J-6080-873-A	
J-7	Camera fixing jig	J-6080-867-A	
J-8	Siemens-star	J-6080-875-A	Flange back adjustment

*1 The PTB-100 (J-6020-490-A) can also be used.

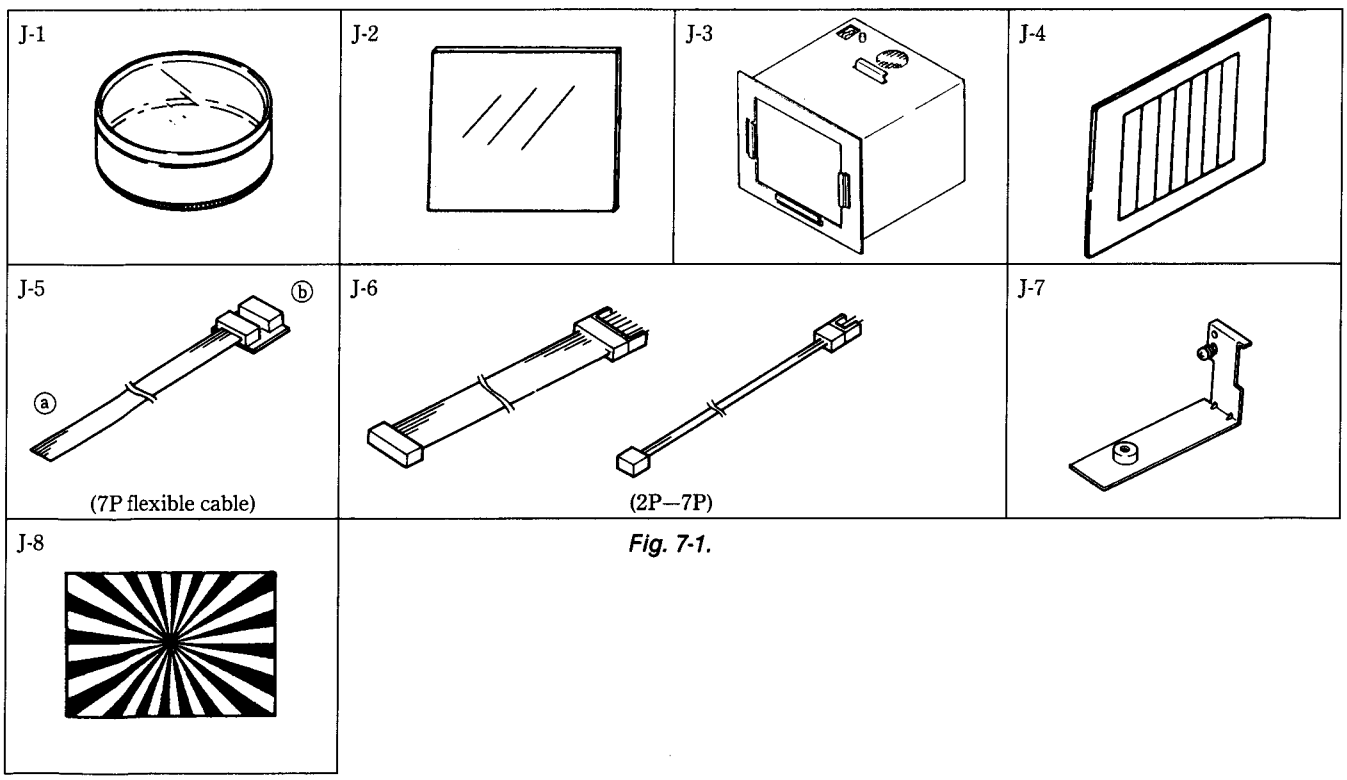


Fig. 7-1.

7-2. PREPARATION

Note:

Refer to SECTION 2. DISASSEMBLY as to details for remove the cabinets and boards.

1) Remove the front cabinet, rear cabinet, cabinet (R) and cabinet (L). When removing the cabinet (L), detach CN205 and CN206 from the MV-12 board.
2) Separate the camera section and video section from each other.
3) Open the camera board in the manner mentioned in 2. DISASSEMBLY OPENING THE CAMERA BOARD.
4) Connect the extension cable as shown in Fig. 7-3.
5) Connect the EVF (Electronic View Finder) to CN207 of the MV-12 board because it is required for adjusting and checking the following parts:
   1) Camera DC-DC converter voltage check
   2) LLA adjustment
   3) EVF section adjustment

   Adjustments and checks other than those above can be performed on the monitor screen.

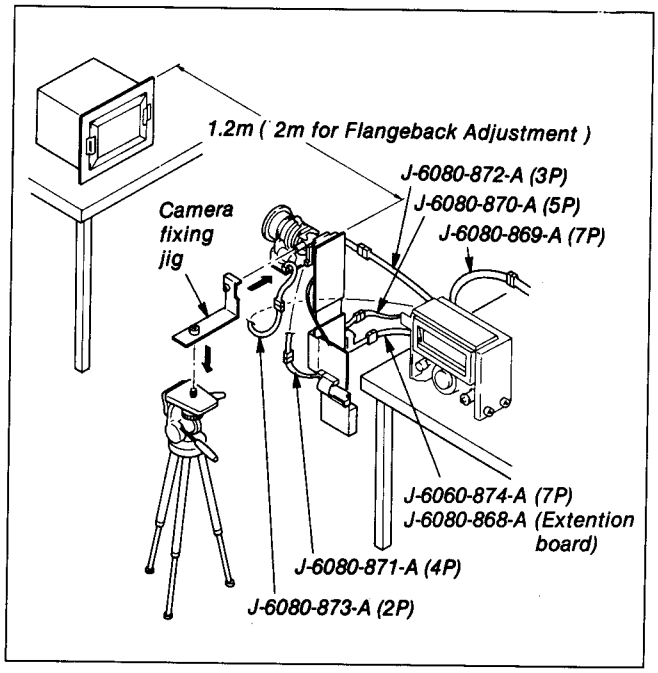


Fig. 7-2.

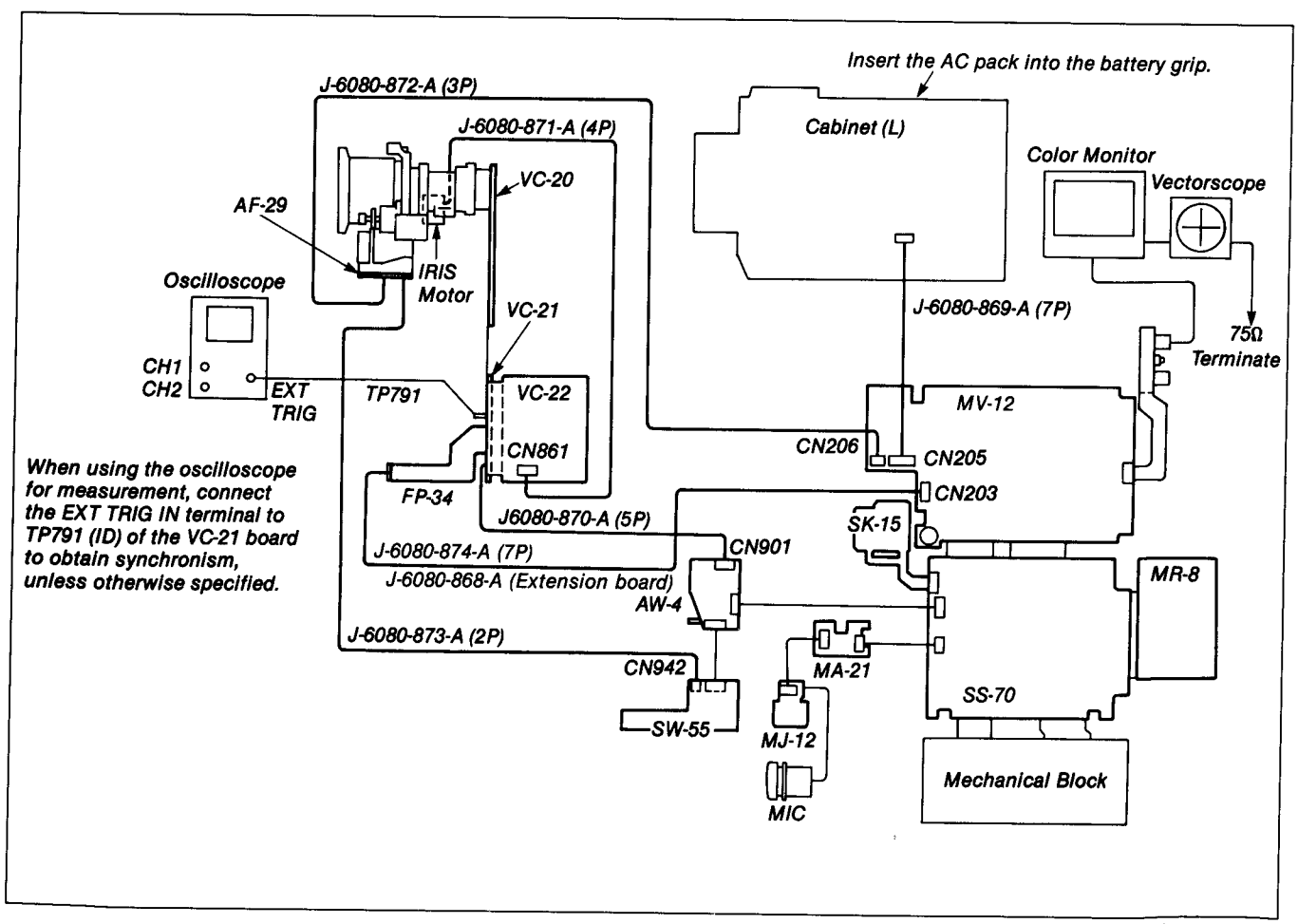


Fig. 7-3.

7-3. PRECAUTIONS

1) Setting the switches
   Adjust the switches to the following positions, when not specified:
   1. Set the FOCUS switch (SW-55 board, S945) to AUTO
   2. Set the WHITE BALANCE switch (SW-55 board, S941) to INDOOR (☼)
   3. Push the BACK LIGHT button (SW-55 board, S942) and confirm that the camera is not BACK LIGHT mode.

2) Adjustment Procedure
   As a rule, adjust in a described order.

3) Subject
   1. Color bar chart (standard picture frame)
      Adjust the picture frame as shown in Fig. 7-4. When using a color chart for adjustment. (Standard picture frame).

Color Bar Chart Standard Picture Frame

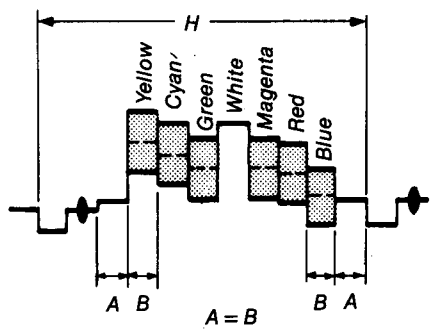


Fig. a (Camera Output Waveform of TP803 on VC-22 Board)

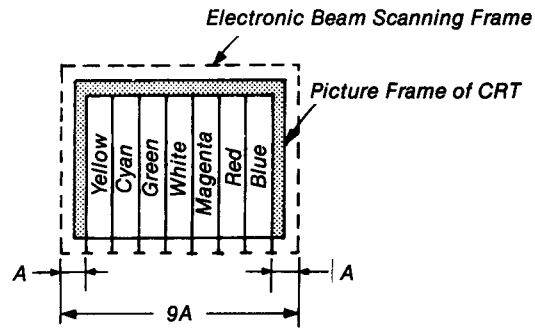


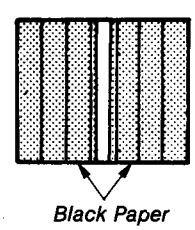
Fig. b (Picture of Monitor TV screen)

Adjust camera zooming and its direction so that the output waveform in Fig. a and the picture in Fig. b can be obtained.

Fig. 7-4.

2. Full white pattern
   Remove the color bar chart from the pattern box and shift the zoom lever fully to the TELE (30mm) side.
3. High brightness pattern
   Create a high brightness pattern as shown in Fig. 7-5, and adjust the picture frame as shown in Fig. 7-6.
4. Siemens star (J-6080-875-A)
   Adjust a camera direction so that a siemens star center will coincide with a monitor screen center on the monitor TV screen.

High Brightness Pattern



Leaving only a half of color bar chart's white width intact, cover the rest with black paper, and take a picture with the standard picture frame.

Fig. 7-5.

High Brightness Pattern

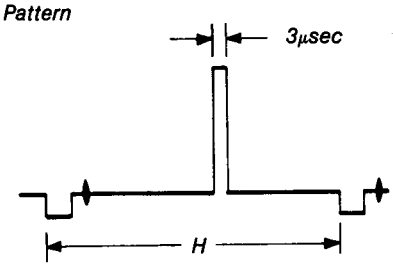


Fig. a (Camera Output Waveform of TP803 on VC-22 Board)

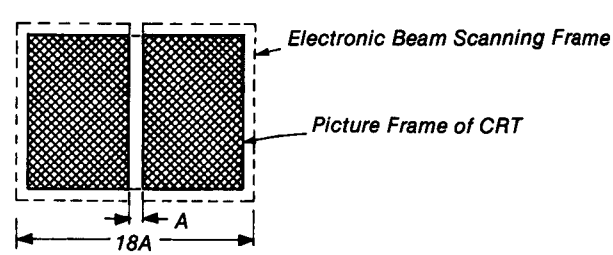


Fig. b (Picture of Monitor TV Screen)

Adjust camera zooming and its direction so that the output waveform in Fig. a and the picture in Fig. b can be obtained.

Fig. 7-6.

7-4. CAMERA SYSTEM ADJUSTMENT

7-4-1. Flange Back Adjustment

Subject	Siemens star at a distance of 2m in the front of a lens datum level (marked with Φ)
Measurement point	Confirm with the monitor TV.
Measurement equipment	
Adjustment element	Flange back adjustment pin
Tools	L wrench (1.5mm), regular screwdriver

[Adjustment Method]

1) Set the FOCUS switch (SW-55 board, S945) to a MANUAL position.
2) Place the Siemens star at a distance of 2m in the front of the lens datum level (see Fig. 7-2.)
3) Adjust the position of the camera section so that the center of the Siemens star displayed on the monitor screen will coincide with the center of the monitor screen.
4) Check that the lens zoom lever can be rotated fully to WIDE (12mm) and TELE (30mm), and rotate fully to the WIDE side. (Also check that the monitor screen is zooming.)
5) Push the BACK LIGHT button to set up BACK LIGHT mode and open the iris.
6) Set the lens focus ring index to the center, "2".

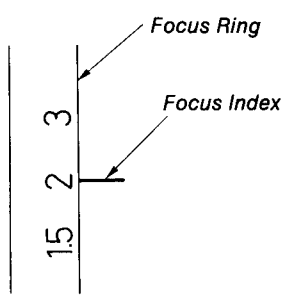


Fig. 7-7.

7) Loosen the hexagon socket head setscrew ❶. (See Fig. 7-10)
8) Viewing the monitor screen, turn the flange back adjustment pin ❷ to make clearest the wedge at the center of the Siemens star on the screen. (Confirm that it is clearest, by turning the pin 2 or 3 times to the right and left.)
   Note:
   Do not turn the adjustment pin too much in one direction.
9) Securely hold the flange back adjusting pin ❷ to prevent it from being rotated, tighten the hexagon socket head setscrew ❶.
10) Set the zoom lever fully to side and rotate the focus ring. Be sure that the position in which the wedge becomes most clear is within a range shown in Fig. 7-8.

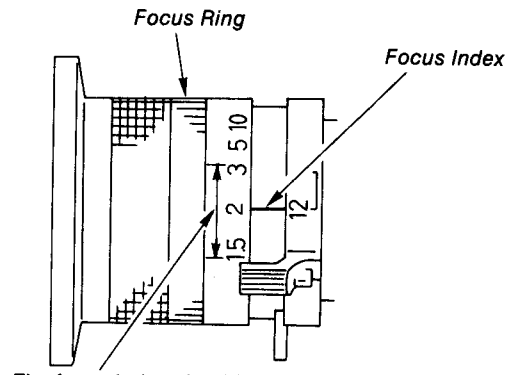


Fig. 7-8.

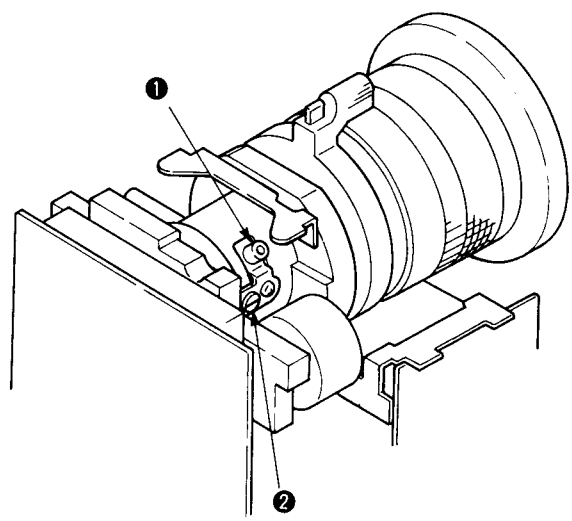


Fig. 7-10.

7-4-2. AF System Adjustment

1. A-B Signal Synchronizing Adjustment (AF-29 and AF-30 Boards)

Subject	Arbitrary
Measurement point	CH1: Pin ⑥ of IC004 on AF-30 board CH2: Pin ④ of IC002 on AF-29 board
Measurement equipment	Oscilloscope
Adjustment element	VR001
Standard	Synchronize the top or bottom peak of CH1 with a rize of CH2.

[Adjustment Method]

1) Synchronize the top or bottom peak of CH1 with the rise of CH2 with VR001.

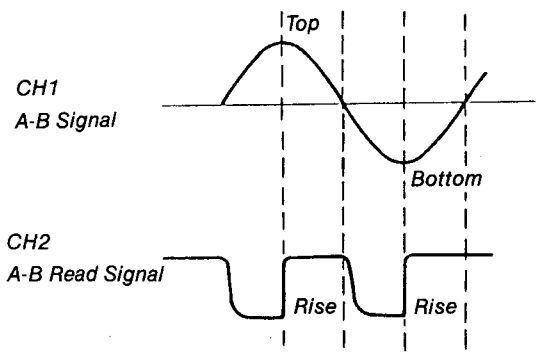


Fig. 7-11.

2. A + B Signal Synchronizing (AF-29 and AF-30 Boards)

Subject	Arbitrary
Measurement Point	CH1: Pin ⑨ of IC004 on AF-30 board CH2: Pin ⑦ of IC002 on AF-29 board
Measurement equipment	Oscilloscope
Adjustment element	VR002
Standard	Synchronize the bottom peak of CH1 with the rise of CH2.

[Adjustment Method]

1) Synchronize the bottom peak of CH1 with the rise of CH2 with VR002.

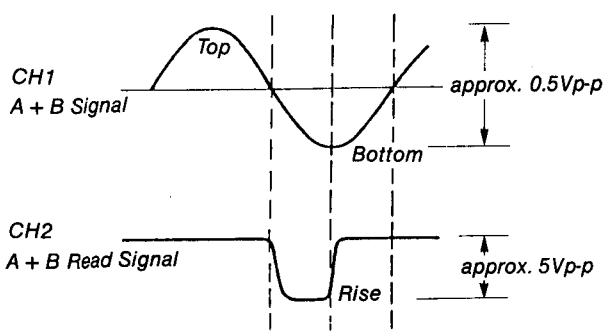


Fig. 7-12.

3. F Speed Adjustment (AF-29 Board)

Measurement equipment	Stop watch
Adjustment element	VR003
Specified value	2.7 ± 1.0 seconds

[Adjustment Method]

1) Turn the camera to arbitrary subject at 1m distance.
2) Fully turn the focus ring to the position of "∞". Adjust to 2.7 ± 1.0 seconds the time required for the focus ring to return to the position of nearest distance when it is released, by turning VR003.

4. Auto Focus Check

Subject	Siemens star (located 2m in front of lens base plane (Φmark))
Specified Value	See Fig. 7-13.

[Checking Method]

1) Place the siemens star 2m in front of the lens base plane.
2) Adjust the position of this unit so that the center of the siemens star displayed on the monitor screen coincides with the monitor screen center.
3) Set the zoom lever to the TELE position (30mm).
4) Focus manually, and confirm that focus index is in the specified position (See Fig. 7-13 (A)). Memorize this position (If the focus index is not within the specified range, perform flange-back adjustment as described in 7-4-1.).
5) Set the FOCUS switch (S945 on the SW-55 board) to the AUTO position.
6) Turn the focus ring to the close-range end position (1.3m) and release it.
7) Confirm that the focus ring will start rotating and the focus index stops at the specified position (See Fig. 7-13 (B)).

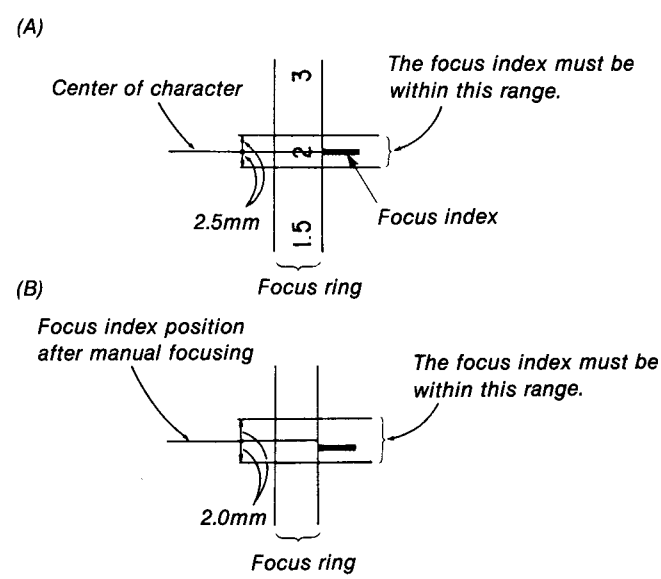


Fig. 7-13.

7-4-3. Camera DC-DC Converter Voltage Check (VC-22 Board)

Measurement equipment	Digital voltmeter
5V check	
Specified value	5.05 ± 0.1V
Measurement Point	Pin ⑧ of CN881
8.5V check	
Specified value	8.5 ± 0.15V
Measurement Point	Pin ⑦ of CN881
12V check	
Specified value	12.0 ± 0.3V
Measurement Point	Pin ⑤ of CN881
20V check	
Specified value	20 ± 0.5V
Measurement Point	Pin ④ of CN881

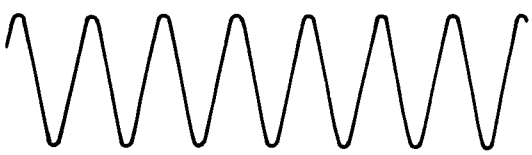
Note:
Check with the EVF section connected.

[Checking Method]
1) Each supply voltage should satisfy its specified value.

7-4-4. Clock Oscillation Frequency Adjustment (VC-20 and DT-61 Boards)

Measurement Point	Pin ㊱ (CL) of the DT-61 board
Measurement equipment	Frequency counter
Adjustment element	CT721 of the VC-20 board
Specified value	14187500 ± 71Hz

[Adjustment Method]
1) Adjust to 14187500 ± 71Hz with CT721.



(14,187,500 ± 71Hz)

Fig. 7-14.

7-4-5. PLL Adjustment (VC-20 Board)

Measurement Point	Pin ㉒ of IC731
Measurement Instrument	Digital voltmeter
Adjustment Element	CT731
Specified Value	2.5 ± 0.2Vdc

[Adjusting Method]
1) Adjust to 2.5 ± 0.2Vdc with CT731.

7-4-6. Iris Set Adjustment (VC-20 and IA-1 Boards)

Subject	Colour bar chart standard picture frame
Filter	ND filters 0.4 and 0.1
Measurement point	TP751 (CCD OUT) of the VC-20 board
Measurement equipment	Oscilloscope
Adjustment element	RV722 (IRIS SET) of the IA-1 board
Specified value	250 ± 5mV

[Adjustment Method]
1) With no ND filter attached, adjust a signal level to 250 ± 5mV using RV722 of the IA-1 board. (See Fig. 7-15)
(Be sure to complete adjustment by turning RV722 in the direction which reduces the signal level.)
2) Attach the ND filter 0.5 (0.4 + 0.1) to the front of the lens, and confirm that the signal level changes smoothly.
3) Detach the ND filter, and confirm that the signal level is 250 ± 5mV.
4) When the specified value is not satisfied, repeat the above-mentioned steps 1) through 3).

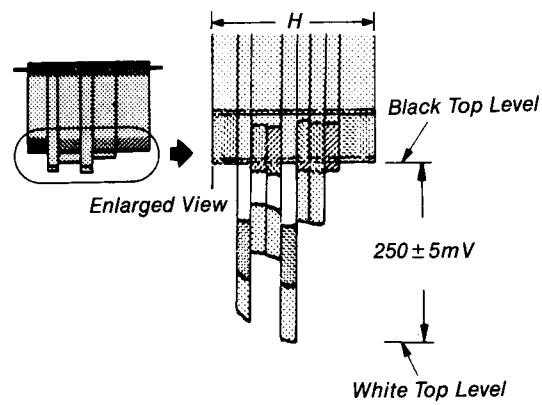


Fig. 7-15.

7-4-7. AGC Set Adjustment (SH-2/VC-20 and IA-1, Boards)

Subject	Colour bar chart standard picture frame
Measurement point	TP752 (G DET) of the VC-20 board
Measurement equipment	Oscilloscope (GND: TP753 of the VC-20 board)
Adjustment element	RV721 (AGC SET) of the IA-1 board
Specified value	250 ± 5mV

Note:
Set to the mechanical center the following 3 RVs of the SH-2 board:
1. RV006 (R GAIN)
2. RV007 (B GAIN)
3. RV008 (MAX GAIN)

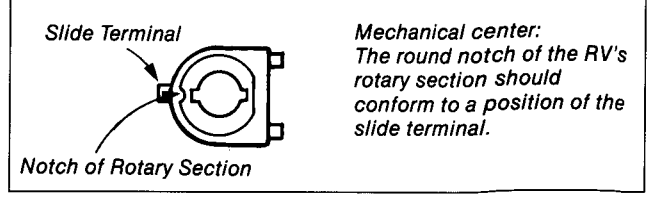


Fig. 7-16.

[Adjustment Method]

1) Adjust a signal level to 250 ± 5mV with RV721 of the IA-1 board.

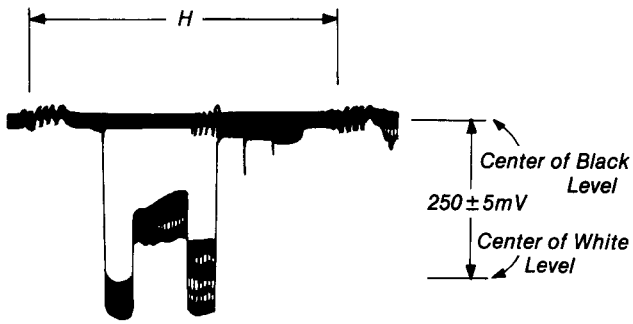


Fig. 7-17.

7-4-8. G Pedestal Adjustment (1) (VC-21, SH-2/VC-20 Boards)

Subject	All black (Cover a black cap on the lens.)
Measurement point	TP781 (G-γ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 (G-PEDESTAL) of the SH-2 board
Specified value	50 ± 5mV

Note:

Rotate fully the following 2 RVs of the SH-2 board in the clockwise direction:

1. RV002 (WHITE CLIP(I))
2. RV003 (GAMMA)

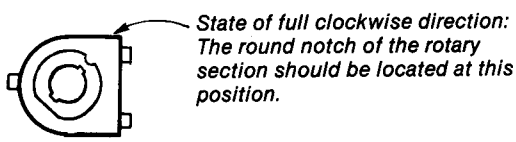


Fig. 7-18.

[Adjustment Method]

1) Adjust a pedestal level to 50 ± 5mV with RV001 of the SH-2 board.

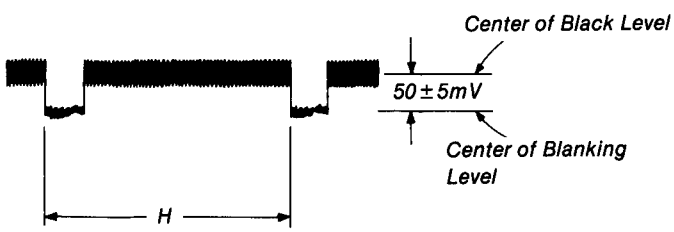


Fig. 7-19.

7-4-9. G-γ Adjustment (VC-21 and SH-2/VC-20 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	TP781 (G-γ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV003 of the SH-2 board
Specified value	430 ± 10mV

[Adjustment Method]

1) Adjust to 430 ± 10mV with RV003 of the SH-2 board.

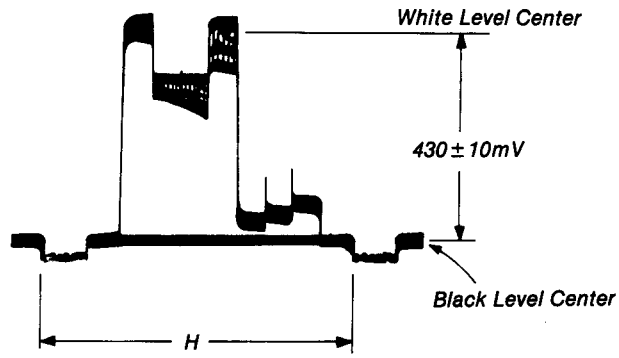


Fig. 7-20.

7-4-10. White Clip Adjustment (1) (VC-21 and SH-2/VC-20 Boards)

Subject	High brightness pattern
Measurement Point	TP781 (G-γ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV002 (WHITE CLIP (1)) of the SH-2 board
Specified value	520 ± 10mV

[Adjustment Method]

1) Adjust a white peak level to 520 ± 10mV with RV002 of the SH-2 board.

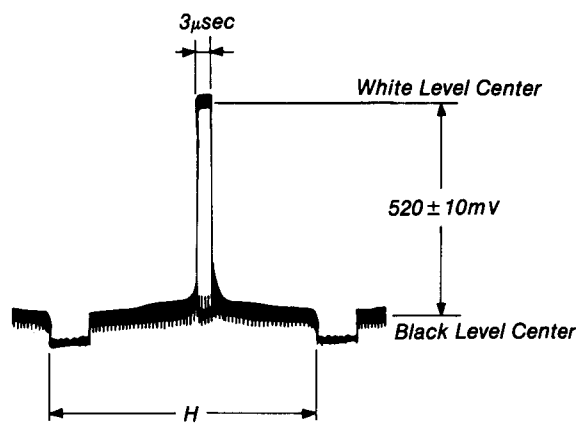


Fig. 7-21.

7-4-11. G Pedestal Adjustment (2) (VC-21 and SH-2/VC-20 Boards)

Subject	All black (Cover a black cap on a lens.)
Measurement point	TP781 (G-γ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the SH-2 board
Specified value	30±5mV

[Adjustment Method]

1) Adjust to 30±5mV with RV001 of the SH-2 board.

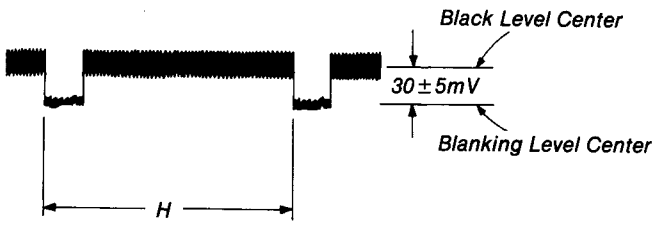


Fig. 7-22.

7-4-12. G-γ Level Check (VC-21 and SH-2/VC-20 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	TP781 (G-γ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV002 of the SH-2 board
Specified value	390±15mV

[Checking Method]

1) Check that the white level is 390±15mV.
2) When the specified value is not, Use RV002 of the SH-2 board to meet it if the specified value is not satisfactory.

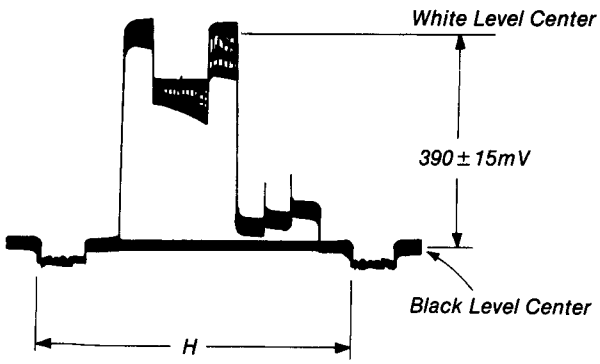


Fig. 7-23.

7-4-13. RB Offset Adjustment (VC-21 and SH-2/VC-20 Boards)

Subject	Full black (Cover the lens with a black cap.)
Measurement point	CH1: TP781 (G-γ) of the VC-21 board CH2: TP782 (RB-γ) of the VC-21 board
Measurement equipment	Oscilloscope (Vertical mode: ADD CH2 polarity: INVERT)
Adjustment element	RV005 (R, OFF SET) of the SH-2 board RV004 (B, OFF SET) of the SH-2 board
Specified value	The blanking level should be at the center of a noise width.

[Adjustment Method]

1) Adjust the blanking level to the center of the noise width with RV005 and RV004 of the SH-2 board.

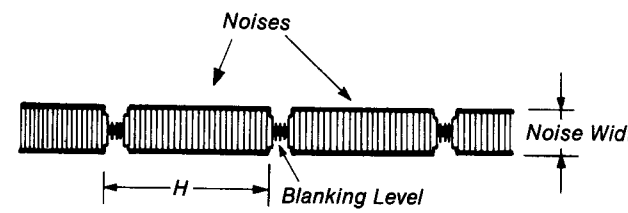


Fig. 7-24.

7-4-14. White Balance Adjustment (VC-21 and SH-2/VC-20 Board)

Subject	Colour bar standard picture frame
Measurement point	CH1 (X): TP790 (B-Y) of the VC-21 board CH2 (Y): TP789 (R-Y) of the VC-21 board
Measurement instrument	Oscilloscope (X-Y mode)
Adjustment element	RV006 (R GAIN) and RV007 (B GAIN) of the SH-2 board
Specified value	The white and black bright points should coincide with each other in location.

[Adjustment Method]

1) By turning RV006 and RV007 of the SH-2 board have the white bright point coincide with the black bright point in location.

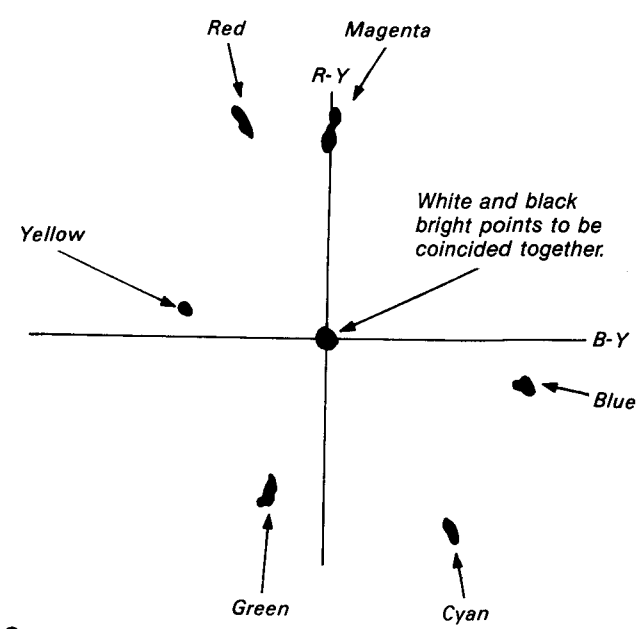


Fig. 7-25.

7-4-15. MPX Adjustment (MX-2/VC-21 Boards)

Subject	All black (Cover a black cap on the lens)
Measurement point	CH1 (X): TP790 (B-Y) of the VC-21 board CH2 (Y): TP789 (R-Y) of the VC-21 board
Measurement equipment	Oscilloscope (X-Y mode)
Adjustment element	RV825 of the MX-2 board
Specified value	There should be only one black bright point whose size is minimum.

[Adjustment Method]

1) Adjust the black spots to one with RV825 of the MX-2 board.

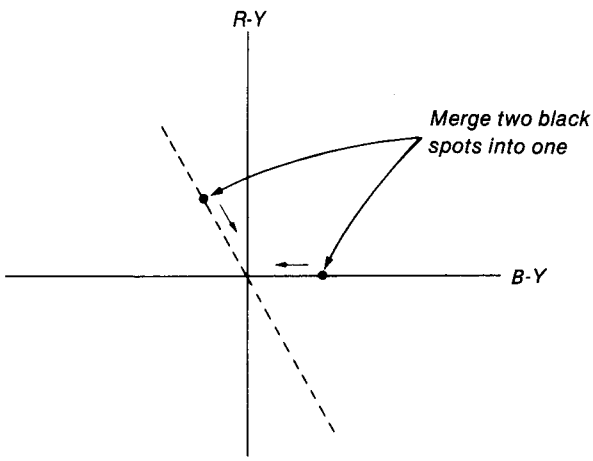


Fig. 7-26.

7-4-16. Carrier Balance Adjustment (VC-22 Board)

Subject	Colour bar chart standard picture frame
Measurement point	TP803 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV804 (CB0°), RV803 (CB90°)
Specified value	The 4.43MHz component of a black part should be minimum.

[Adjustment Method]

1) Minimize the amplitude of the black part with RV804 and RV803.

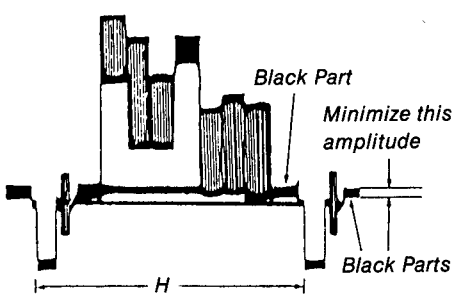
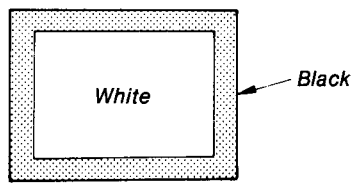


Fig. 7-27.

7-4-17. Matrix Gain Adjustment (MX-2/VC-21 Boards)

Subject	White pattern (Include a black frame. See Fig. 7-28.)
Measurement equipment	Oscilloscope Vertical mode: ADD CH2 polarity: INVERT
G1 gain adjustment	
Measurement point	CH1: TP783 (G0) of the VC-21 board CH2: TP784 (G1) of the VC-21 board
Adjustment element	RV821 (G1) of the MX-2 board
Specified value	There should be no difference in level between white and black parts.
G2 gain adjustment	
Measurement point	CH1: TP783 (G0) of the VC-21 board CH2: TP785 (G2) of the VC-21 board
Adjustment element	RV823 (G2) of the MX-2 board
Specified value	There should be no difference in level between white and black parts.
RB gain adjustment	
Measurement point	CH1: TP788 (RB0) of the VC-21 board CH2: TP787 (RB1) of the VC-21 board
Adjustment elements	RV822 (RB1) of the MX-2 board
Specified value	There should be no difference level between white and black parts.
RB2 gain adjustment	
Measurement point	CH1: TP788 (RB0) of the VC-21 board CH2: TP786 (RB2) of the VC-21 board
Adjustment element	RV824 (RB2) of the MX-2 board
Specified value	There should be no difference in level between white and black parts.



(Display pattern box with standard picture frame)

Fig. 7-28.

[Adjustment Method]

1) Eliminate differences in level between white and black parts with each RV.

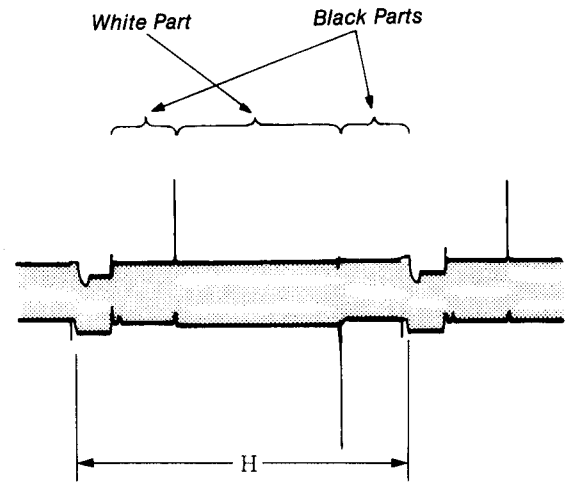


Fig. 7-29.

Note:

After adjustment, confirm the MPX adjustment and carrier balance adjustment. When each specified value is not met, make readjustment.

7-4-18. Set up Adjustment (VC-22 Board)

Subject	All black (Cover a black cap on the lens)
Measurement point	TP803 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV807 (PED)
Specified value	25±5mV

[Adjustment Method]

1) Adjust a setup level to 25±5mV with RV807.

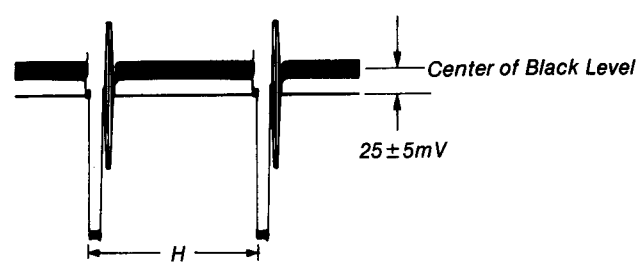


Fig. 7-30.

7-4-19. Y Level Adjustment (VC-22 Board)

Subject	Colour bar chart (Standard picture frame)
Measurement point	TP803 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV809 (YG)
Specified value	350 ± 10mV

Note:

Turn RV810 (WC2) fully in the clockwise direction to maximize the signal level of TP803.

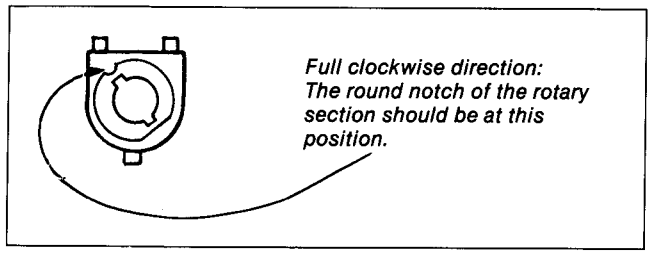


Fig. 1-31.

[Adjustment Method]

1) Adjust the Y level to 350 ± 10mV with RV809.

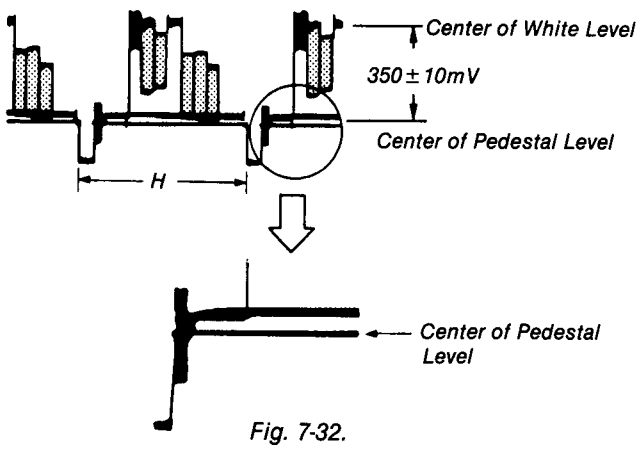


Fig. 7-32.

Note:

After adjustment, check the SETUP adjustment. When the specified value is not met, make readjustment.

7-4-20. Aperture Adjustment (VC-22 and IA-1/VC-22 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	TP803 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV802 (APS) and RV801 (APL) of the VC-22 board
Specified value	RV802: Aperture level at 135 ± 5mVp-p RV801: Aperture level at 90 ± 5mVp-p

Note:

Preset the following RVs:

1. RV802 (APS) of the VC-22 board . . . Mechanical center
2. RV801 (APL) of the VC-22 board . . . Fully in the clockwise direction (◯).
3. RV810 (WHITE CLIP (2)) of the VC-22 board . . . Fully in the clockwise direction (◯).
4. RV723 (LLA) of the IA-1 Board . . . Fully in the counter clockwise direction (◯).

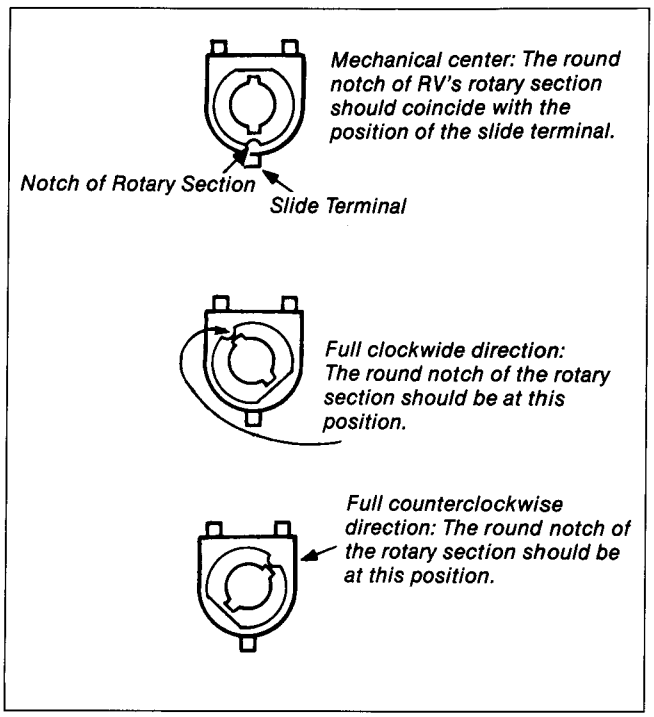


Fig. 7-33.

[Adjustment Method]

1) After focusing, swing the camera section slightly to the right and left and fix it at the point where an aperture level between white and magenta (see Fig. 7-34) is maximized.
2) Adjust the aperture level to 135 ± 5mV with RV802 of the VC-22 board.
3) Adjust the aperture level to 80 ± 5mV with RV801 of the VC-22 board.

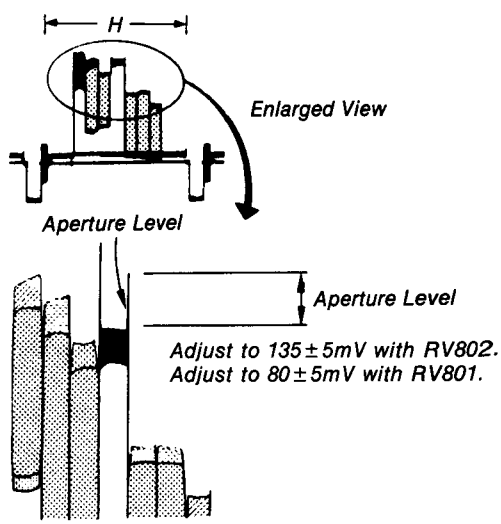


Fig. 7-34.

Note 2:

Re-adjust the RV810 and RV723 being preset in 'Note 1', following each item of adjustment.

7-4-21. White Clip Adjustment (2) (VC-22 Board)

Subject	High brightness pattern
Measurement point	TP803 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV810 (WHITE CLIP (2))
Specified value	420 ± 10mV

[Adjustment Method]

1) Adjust a signal level to 420 ± 10mV with RV810.

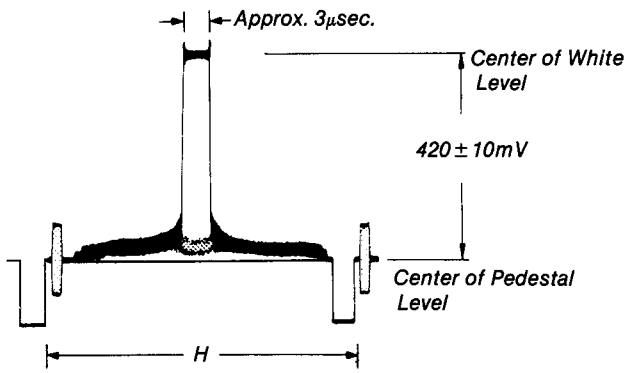


Fig. 7-35.

7-4-22. Max. Gain Adjustment (VC-22 and SH-2/VC-20 Boards)

Subject	Colour bar chart standard picture frame
Filter	ND filter 0.9 . . . 2 pcs.
Measurement point	TP803 (CAM OUT) of the VC-22 board
Measurement equipment	Oscilloscope
Adjustment element	RV008 (MAX GAIN) of the SH-2 board
Specified value	180 ± 10mV

[Adjustment Method]

1) Cover an ND filter 1.8 (0.9 + 0.9) in front of the lens.
2) Adjust to 180 ± 10mV with RV008 of the SH-2 board.

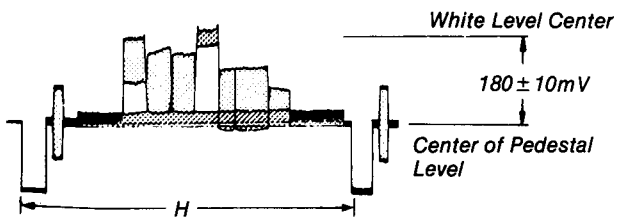


Fig. 7-36.

7-4-23. AGC Set Confirmation/Adjustment (VC-20 and IA-1/VC-22 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	TP752 (G DET) of the VC-20 board
Measurement equipment	Oscilloscope (GND: TP753 of the VC-20 board)
Adjustment element	RV721 (AGC SET) of the IA-1 board
Specified value	250 ± 15mV

[Confirmation Method]

1) Check that a signal level is 250 ± 15mV.
2) When the specified value is not met, adjust to 250 ± 15mV with RV721 of the IA-1 board.

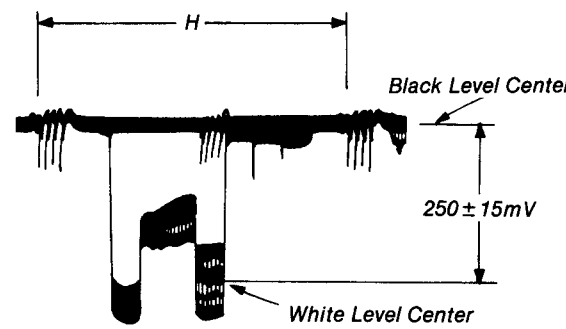


Fig. 7-37.

Note:

After adjustment, check the R gain and B gain adjustment. If each specified value is not met, make readjustment.

7-4-24. Burst Phase and Burst Level Adjustment (VC-22 Board)

Object	Colour bar chart standard picture frame
Measurement point	TP803 (CAM OUT) of the VC-22 board
Measurement instrument	Oscilloscope Trigger slope: +
Adjustment element	RV806 (HUE) and RV805 (BURST GAIN) of the VC-22 board
Specified value	(Burst phase) Should become a single line. (Burst level) 150 ± 5mVp-p

Note: When performing colour reproductivity adjustment with a vectorscope, this adjustment becomes unnecessary.

[Adjusting Method]

1) Make burst waveform into a single line with RV806. There are 2 points in the rotating range of RV806 in which the waveform becomes a single line. Select the one in which the colour is reproduced correctly on the monitor screen.
2) Turn RV805 so that the burst amplitude becomes 150±5mVp-p.

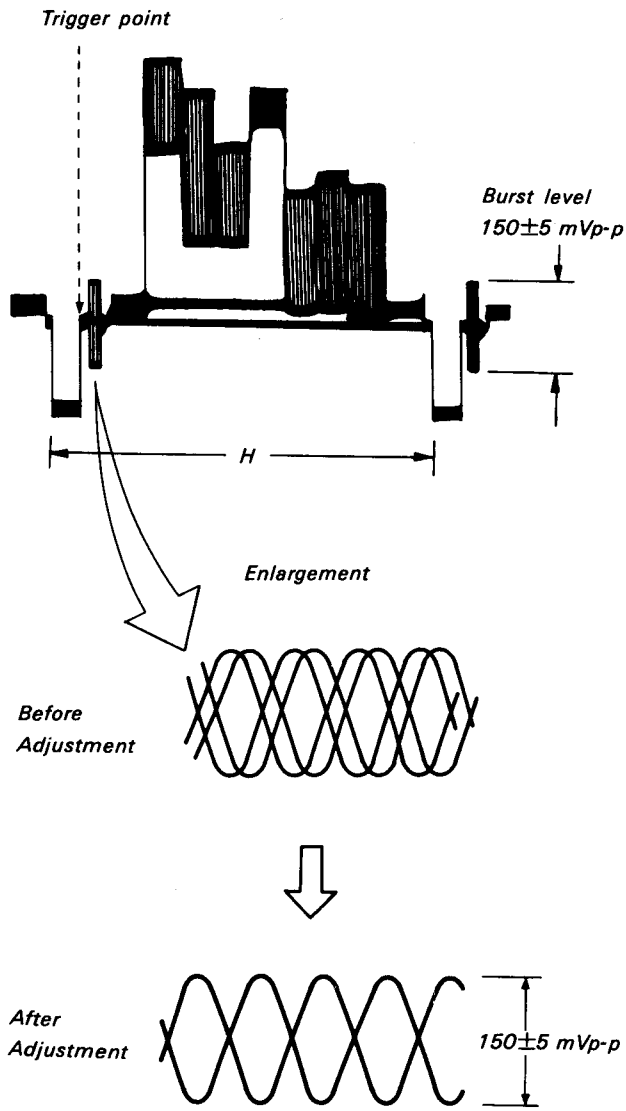


Fig. 7-38.

7-4-25. Colour Reproducibility Adjustment (Use a Vectorscope) (MX-2/VC-21 and VC-22 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	VIDEO OUT terminal
Measurement equipment	Vectorscope *Paste a colour reproduction frame for vectorscope.
Adjustment element	RV827 of the MX-2 board (B-Y GAIN) RV781 of the VC-21 board (B-Y MIX) RV782 of the VC-21 board (R-Y MIX) RV808 of the VC-22 board (CHROMA GAIN) RV806 of the VC-22 board (HUE) RV805 of the VC-22 board (BURST GAIN)
Specified value	Each colour bright point should be within a colour reproduction frame. (See Fig. 7-39)

Note:

Before this adjustment confirm that a burst bright point is at a specified position, and that a white bright point coincides with an origin. (When the white bright point and the origin do not coincide with each other, carry out white balance adjustment (RV006 and RV007 of the SH-2 board) and carrier balance adjustment (RV803 and RV804 of the VC-22 board).)

[Adjustment Method]

1) Turn RV806 and RV805 of the VC-22 board and mutch the burst bright spot at the specified location (135°, 75%) on the vector scope.
2) Place a "red" bright point within the colour reproduction frame with RV808 of the VC-22 board and RV782 of the VC-21 board.
3) Place a "yellow" bright point within the colour reproduction frame with RV827 of the MX-2 board and RV781 of the VC-21 board.
4) Place each colour bright point within the colour reproduction frame, repeating the above-mentioned steps 2) and 3).
5) Place the white balance switch (S941 of the SW-55 board) outdoor (☼).
6) Check that the 'white' brightness point moves into the outdoor colour reproduction frame. (See Fig. 7-39)

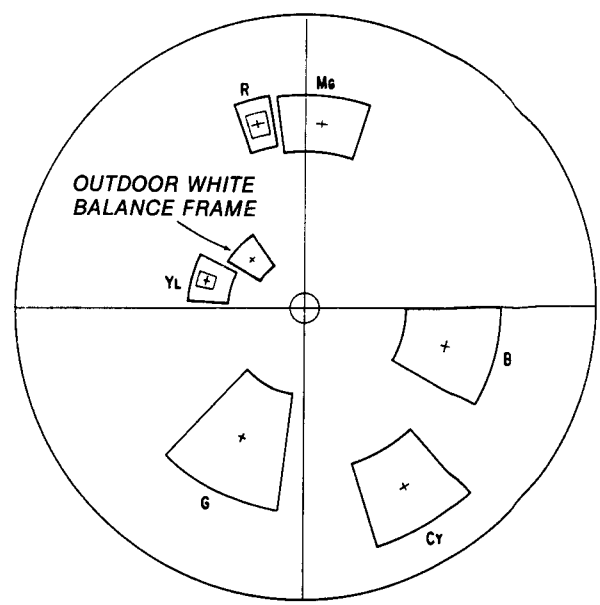
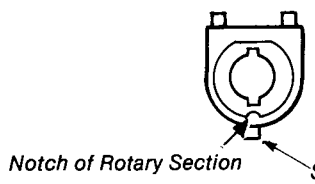


Fig. 7-39.

7-4-26. Colour Reproducibility Adjustment (Use a Oscilloscope)

A. Gain Adjustment (MX-2/VC-21 and VC-22 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	TP803 (CAM OUT) of the VC-22 board
Measurement equipment	Oscilloscope
Adjustment element	RV827 (B-Y GAIN) of the MX-2 board RV808 (CHROMA GAIN) of the VC-22 board
Specified value	"Magenta" level: 235 ± 5mVp-p "Yellow" level: 131 ± 5mVp-p



Mechanical center: The round notch of the RV's rotary section should coincide with the position of the slide terminal.

Fig. 7-40.

[Adjustment Method]

1) Set RV781 (B-Y MIX) and RV782 (R-Y MIX) of the VC-21 board to the mechanical center. (See Fig. 7-40)
2) Adjust an amplitude of "magenta" to 235 ± 5mVp-p with RV808 of the VC-22 board. (See Fig. 7-41 ①)
3) Adjust an amplitude of "yellow" to 131 ± 5mVp-p with RV827 of the MX-2 board. (See Fig. 7-41 ②)

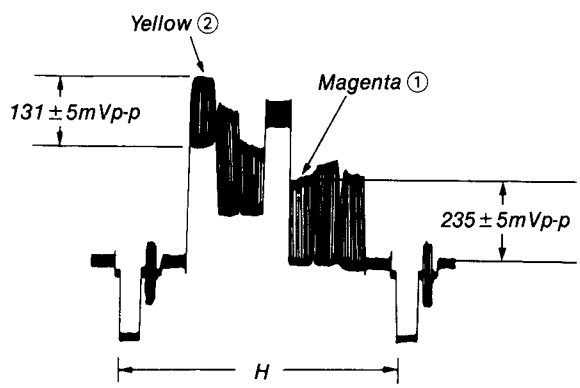


Fig. 7-41.

B. Hue Adjustment (VC-21 and SH-2/VC-20 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	CH1 (X): TP790 (B-Y) of the VC-21 board CH2 (Y): TP789 (R-Y) of the VC-21 board
Measurement equipment	Oscilloscope (X-Y mode) *Paste a color reproduction frame for oscilloscope.
Adjustment element	RV781 (B-Y MIX) of the VC-21 board RV782 (R-Y MIX) of the VC-21 board
Specified value	Each colour bright point should be within the colour reproduction frame. (See Fig. 7-42)

[Adjustment Method]

1) Coincide a "black" point on the oscilloscope with the origin of the colour reproduction frame.
2) Check that a "white" bright point and a "black" bright point coincide with each other. (If they are not coincident, make white balance adjustment (RV006 and RV007 of the SH-2 board).)
3) Place a "red" bright point and a "yellow" bright point within the color reproduction frame with RV781 and RV782 of the VC-21 board. (Check that each of other colour bright points is located within the color reproduction frame.)
4) Confirm colours reproduced on the monitor screen.
   Notes: "Magenta" is reproduced reddish.
5) Place the white balance switch (S941 of SW-55 board) outdoor (☼).
6) Check that the white brightness point moves to the place between 'red' and 'yellow' standard frame.

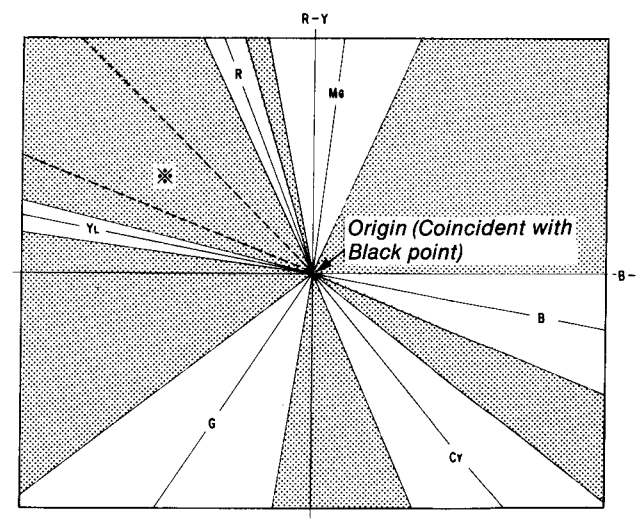


Fig. 7-42.

※: Movable range of the white bright point under the condition that the white balance switch is turned into 'Outdoor' position.

7-4-27. LLA Adjustment (IA-1 Board)

Subject	Colour bar chart standard picture frame
Filter	ND filter 0.9 . . . 1 pc. ND filter 0.1 . . . 1 pc. ND filter 0.4 . . . 1 pc.
Measurement point	Observe an EVF display
Measurement equipment	
Adjustment element	RV723 (LLA)
Specified value	"LOW LIGHT" should be displayed with the ND filter 1.4, and "LOW LIGHT" not displayed with the ND filter 1.3.

[Adjustment Method]

1) Select either STANDBY or REC mode.
2) Attach the ND filter 1.4 (0.9+0.4+0.1) to the lens.
3) Rotate RV723 lest "LOW LIGHT" should be displayed at the EVF.
4) Rotate RV723 slowly and stop it when "LOW LIGHT" is displayed.
5) Remove just one ND filter of 0.1.
6) Check that a display "LOW LIGHT" disappears.

Note: Response will take several seconds.

7) When it does not disappear, repeat the above-mentioned steps 2) through 6).

7-4-28. Auto-following white balance adjustment (AW-4 Board)

Subject	White pattern *Note 1)
Measurement point	CH1: Pin ⑤ of CN901 (R CONT) CH2: Pin ④ of CN901 (B CONT)
Measurement equipment	Oscilloscope (DC range)
Adjustment element	RV901

Note 1:

Make white-balance sensor (AW-4 board SB901) incident by light through white-dispersing plate which can be applied with the conventional white-lens cap of camera.

Note 2:

No exact adjustment is made by the incident light except pattern-box to the white-balance box.

It is desirable to make adjustment in a dark room, but if it is impossible, make adjustment after taking the following procedures.

1. Place the camera on black paper.
   (This procedure is necessary for the adjustment in a dark room.)
2. Approach the distance between camera and pattern box to less than 0.5m.
3. Cover a black paper on white-balance sensor for preventing the incident light except pattern box to the white-balance sensor.

[Connection]

Make the following connection for setting test-mode.

1. Connect W901 ① pin with GND by jamper wire.
2. Confirm the position of white-balance SW (SW-55 board S941) at indoor "☼".

[Adjusting Method]

1) Turn RV901, and confirm that CH1 takes 2 values of "L" (2.5Vdc) and "H" (2.7Vdc), also that CH2 takes 2 values of "L" (2.0Vdc) and "H" (2.6Vdc).
2) Turn RV901 slowly, and stop it when CH1 shows the position of "H" (2.7Vdc) and CH2 shows the position of "L" (2.0Vdc).

7-4-29. Operation check for auto-following white balance

Subject	White pattern * Note
Filter	Filter C22 for correcting the colour temperature
Measurement point	Check on monitor-TV
Measurement equipment	

Note:
See the previous item, Note 2.

[Checking method]

1) Set the white-balance SW to auto-position. (SW-55 board 941)
2) By covering the camera with a black paper, prevent the incident light except pattern-box to white-balance sensor (AW-4 board SB901).
3) Confirm no-colour on the monitor-screen.
4) Cover the filter C22 for correcting the temperature compensation on white-balance sensor. (Prevent the other incident light than the filter by using a black paper.)
5) Confirm the orange-like colour of monitor-screen display. (The response needs 1 or 2 seconds.)
6) Return the position of SW to indoor "☼".

7-4-30. Check for backlight compensation (VC-22 board)

Subject	Colour bar chart standard image frame
Measurement point	TP803 (CAM OUT)
Measurement equipment	Oscilloscope

[Checking method]

1) Push the button for backlight compensation (SW-55 board S942).
2) Confirm that higher level of Y-signal induces higher chroma-level of "red" and "mazenta" and "blue".
3) Confirm no-colour on white-part in monitor-TV screen.

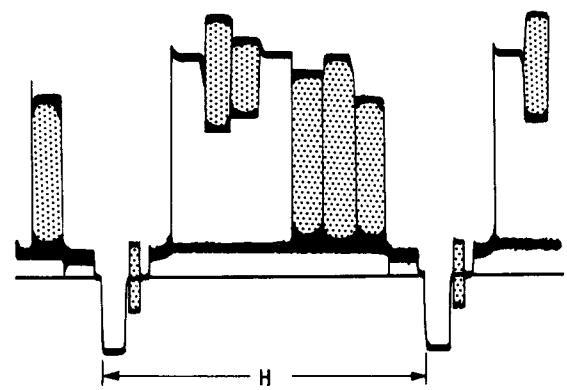
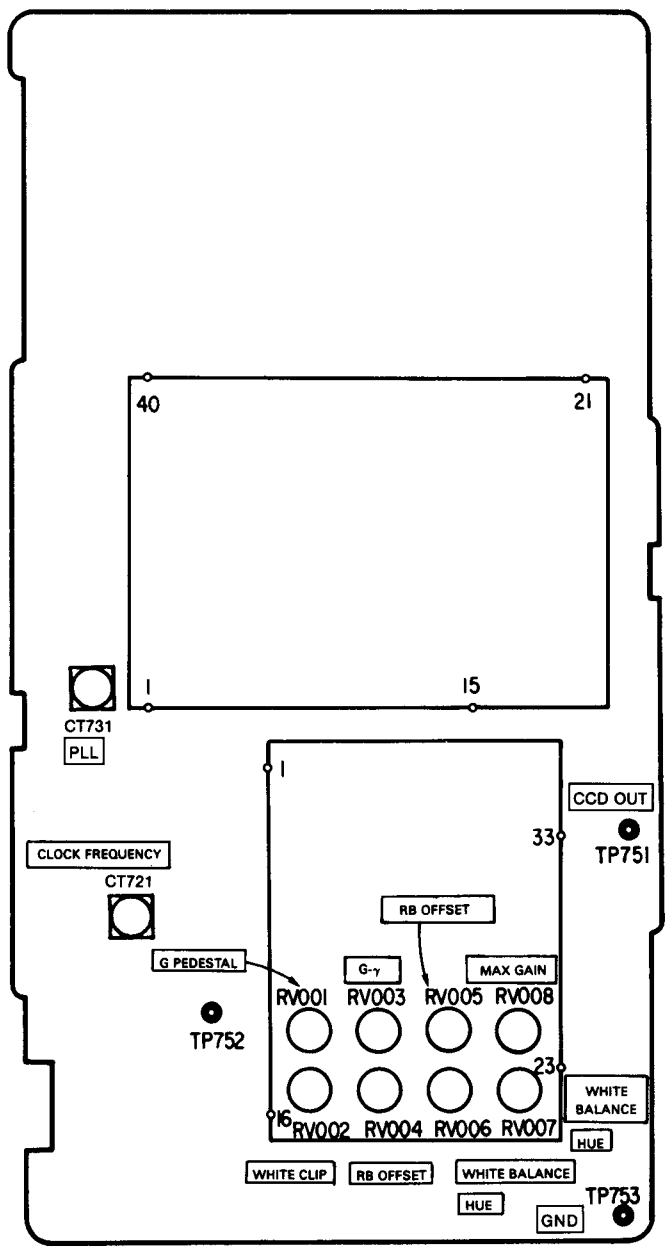


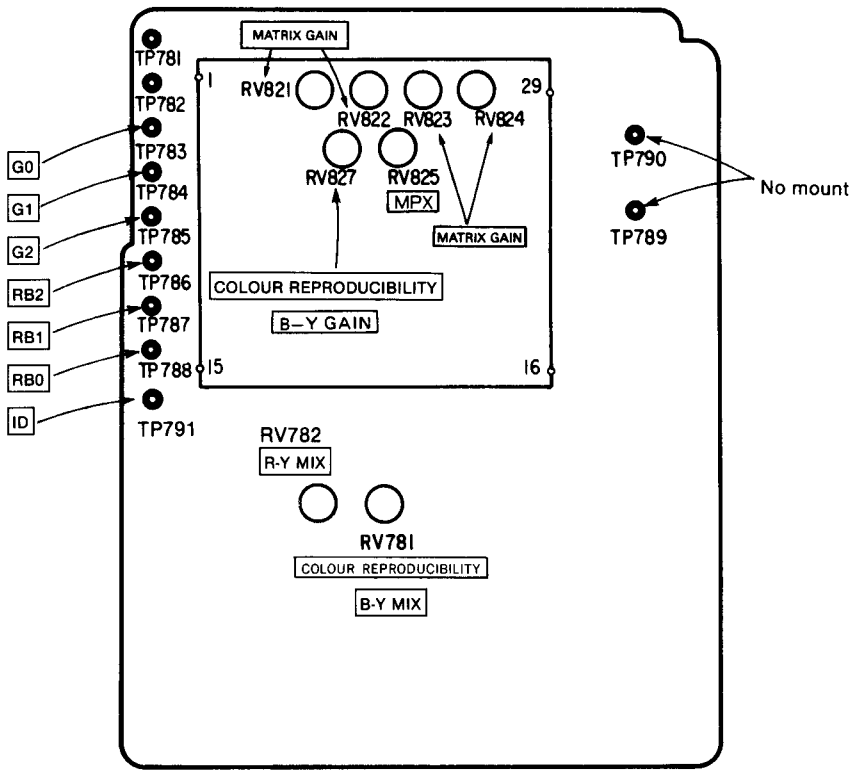
Fig. 7-43.

7-5. ADJUSTMENT ELEMENT LOCATION

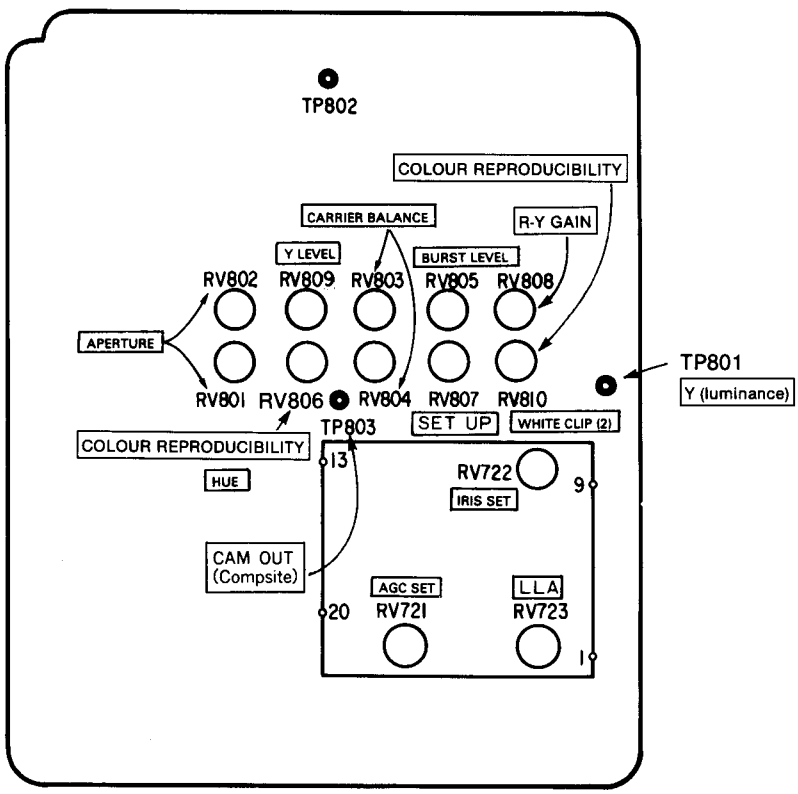
VC-20 BOARD(COMPONENT SIDE)



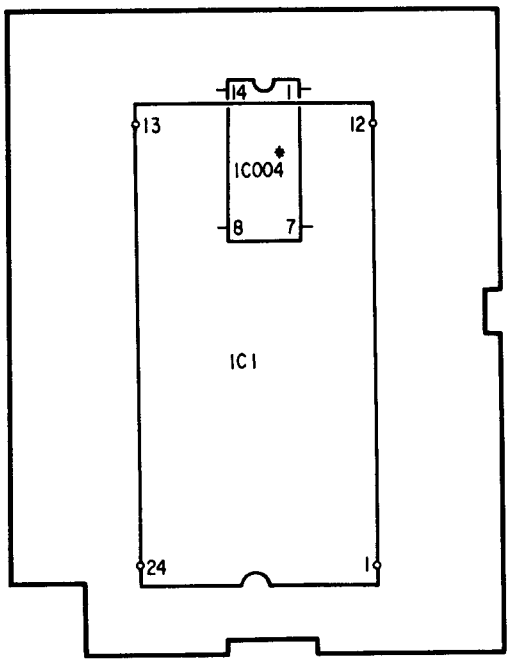
VC-21 BOARD (COMPONENT SIDE)



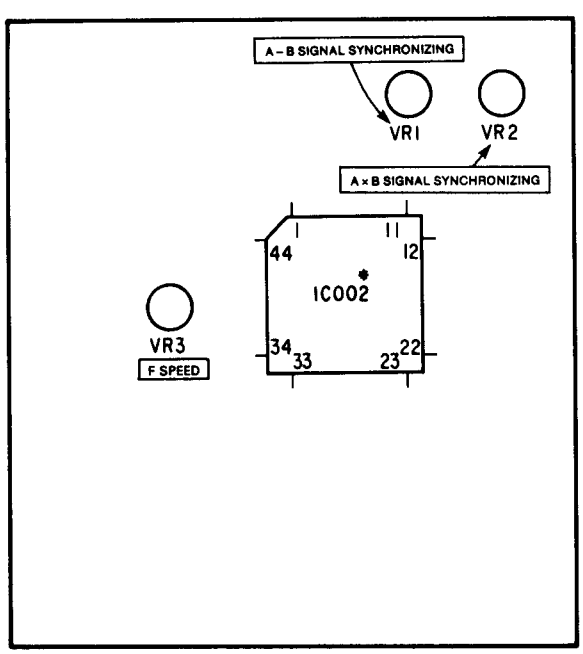
VC-22 BOARD (COMPONENT SIDE)



AF-30 BOARD(COMPONENT SIDE)



AF-29 BOARD(COMPONENT SIDE)



SECTION 8
MECHANICAL ADJUSTMENT (VIDEO SECTION)

8-1. PREPARATION FOR CHECK, ADJUSTMENT AND REPLACEMENT OF THE MECHANICAL SECTIONS

With regard to removal of the cabinet grip, board, etc. see **"SECTION 2 DISASSEMBLY"**

8-1-1. Cassette Arm Assembly (See Fig. 8-1)

1. Removal

1) Remove screws ❶, ❷, ❸ and ❹.
2) Remove cassette arm assembly ❺.

2. Installation

1) Install cassette arm assembly ❺ to the main body so that the two positions of pins ❻ enter the predetermined positions.
2) Put the dowel ❽ of the frame assembly into the reference hole ❼ of the cassette arm, and tighten the screws ❶ and ❷ in that order.
3) Install screw ❸ loosely and tighten in the order of screw ❹ and screw ❸.

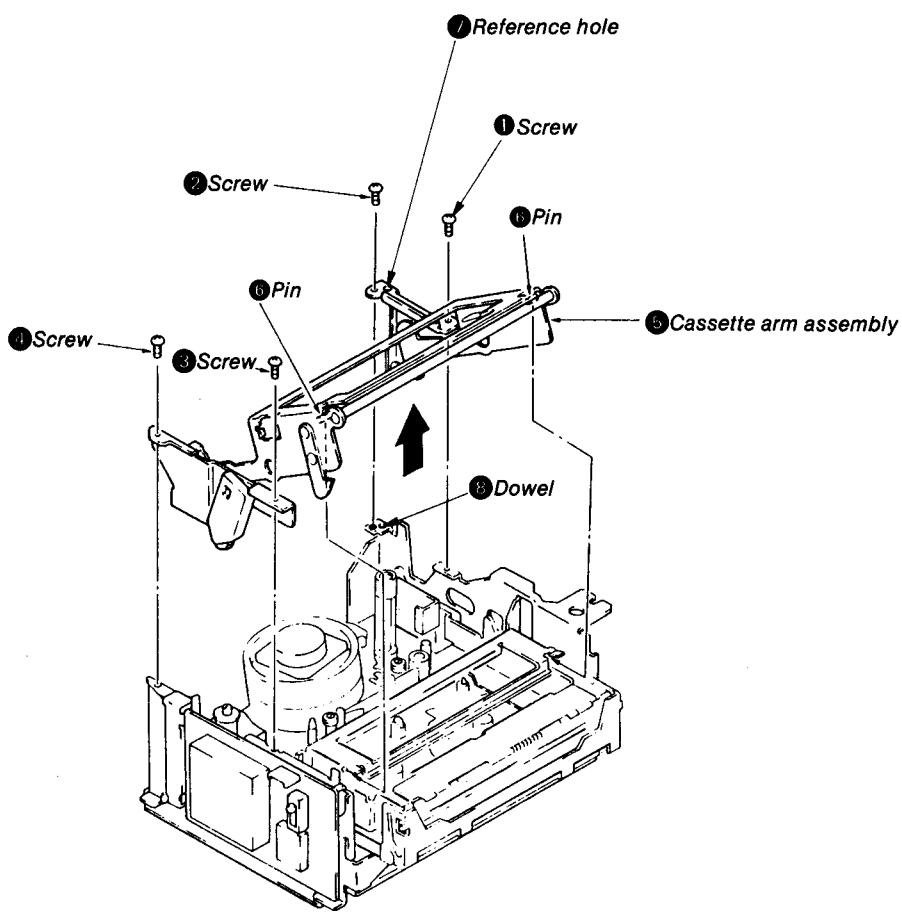


Fig. 8-1.

8-1-2. LS cassette Compartment Assembly (See Fig. 8-2)

1. Removal

1) Remove screws ❶, ❷, ❸ and ❹.
2) Push two positions of the slot ❽ of LS frame ❻ in the direction of arrow Ⓐ, and remove two positions of pin ❺ and ❾. (Since the pin (C) ❺ is longer, remove the pin (B) ❾ first.)
3) Remove LS cassette compartment assembly ❼.

2. Installation

1) Install LS cassette compartment assembly ❼ to the main body.
2) Push the two positions of slot ❽ of LS frame in the direction of arrow Ⓐ, and insert pin ❺ at two positions. (Since the pin (C) ❺ is longer, insert this pin first.)
3) Install screws ❸ and ❹ loosely and tighten in the order of screws ❶, ❷, ❸ and ❹.

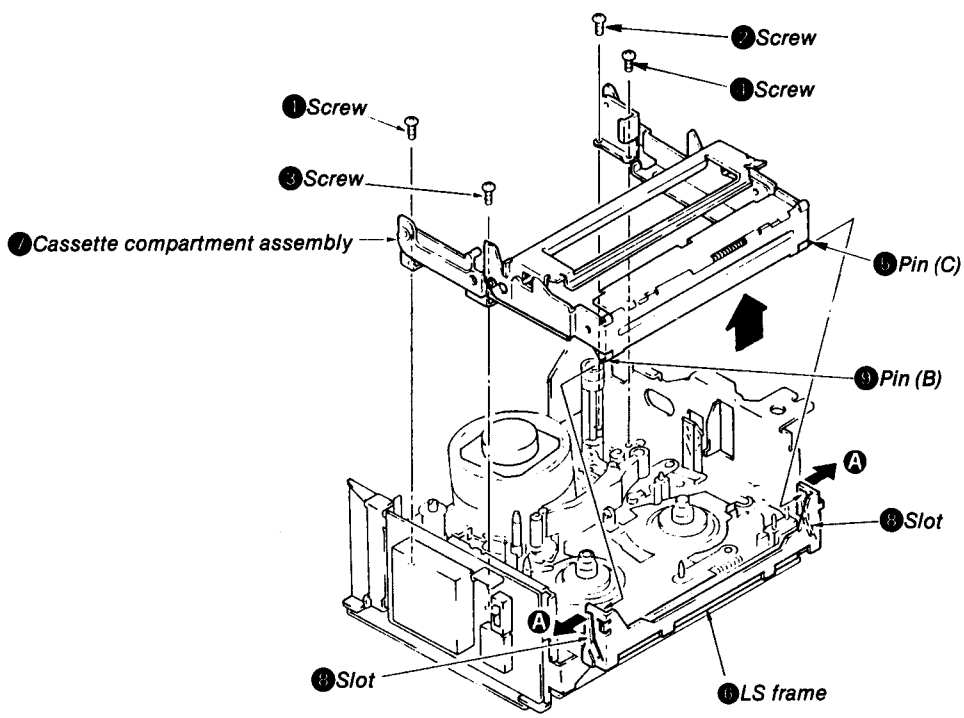


Fig. 8-2.

8-1-3. Extracting Method with the Cassette Loading End State

1) By referring, Section 2 Disassembly 2-15, set SS-70 board up to be able to open.
2) By referring 8-1-5, connect the mode selector.
   Note:
   The mode indicated by ▭ is set by pushing the buttons of the mode selector.
3) Set up [GUIDE LOAD] mode, and move each tape guide from the position shown in Fig. 8-4 to the position shown in Fig. 8-5.
4) Open SS-70 board ❶ and MV-12 board and wind up tape into cassette by rotating the rotor ❷ in the direction of arrow. (See Fig. 8-3)
   Note:
   Though in [GUIDE LOAD] mode, cannot wind up tape when each guide is not positioned as shown in Fig. 8-5, close to the casseette.
5) Be sure to wind up tape completely, and set up [EJECT] mode, then take out the cassette.

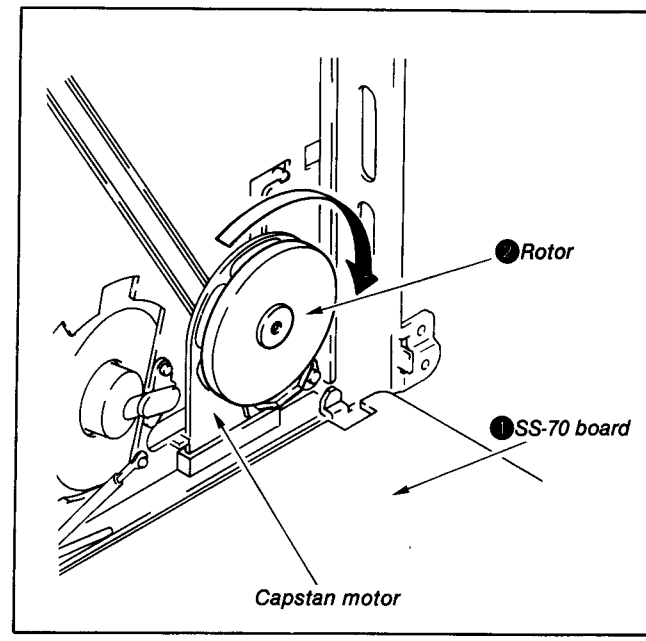


Fig. 8-3.

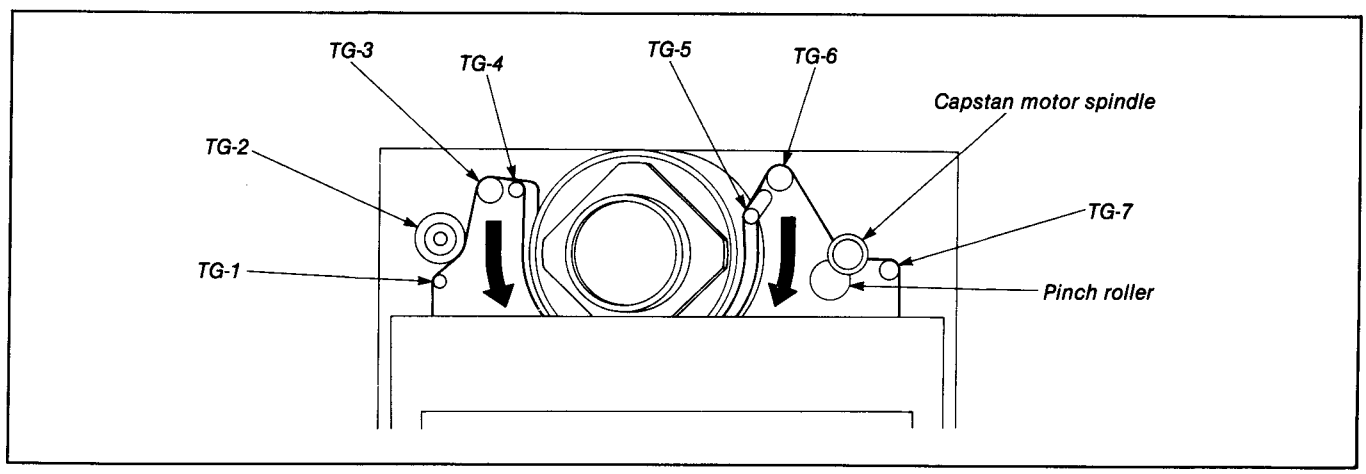


Fig. 8-4.

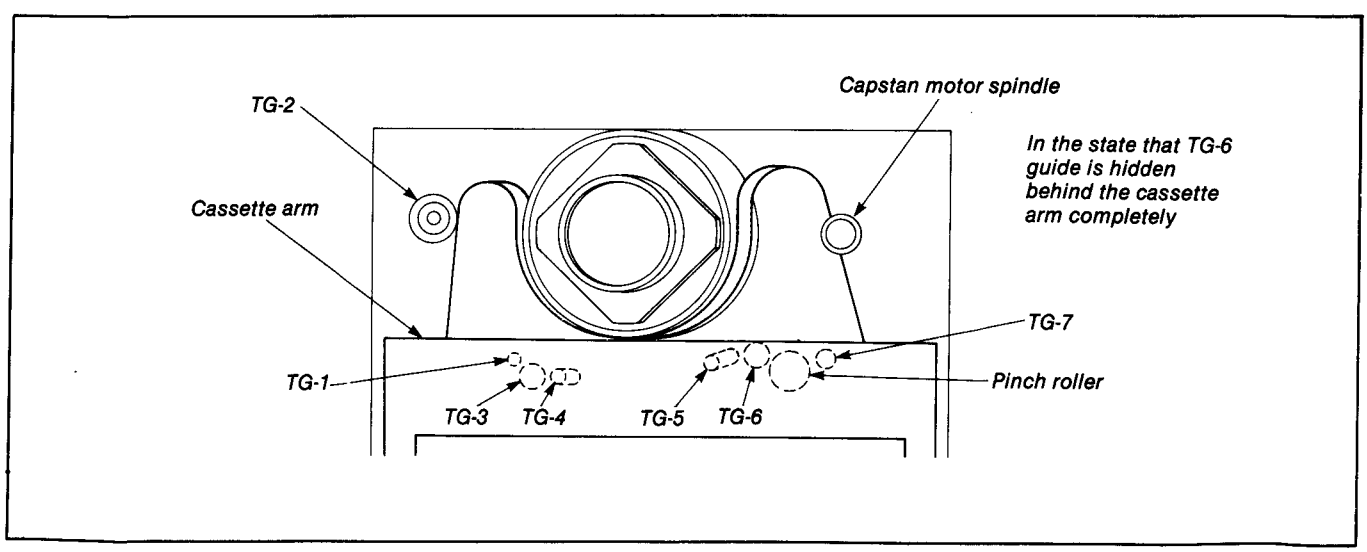


Fig. 8-5.

8-1-4. Cassette and Cassette Arm Assembly, and a Method to Operate the Set in the State of the LS Cassette Compartment Assembly being Removed

1. Method to load a cassette. (See Fig. 8-6.)

1) Set the battery pack on the battery holder assembly ❶.
2) Set the battery holder assembly ❶ into the cabinet (L) ❷.
3) Set the connector ❸ which comes out from the cabinet (L) ❷ to pin ❹ of CN205 on the MV-12 board.
4) Cover the LED assembly.
5) Maintain the state in which the pin of push SW ❼ is being depressed (ON state) and secure it with adhesive tape ❽.
6) When pushing the return prevention arm ❾ is pushed into the direction of arrow Ⓐ, the set becomes into the loading state.

2. Method to set into the REC state

1) When step 1 has been completed, set power supply switch ● on the SK-15 board to the camera position.

3. Method to EJECT

1) Turn ON the EJECT SW ●.

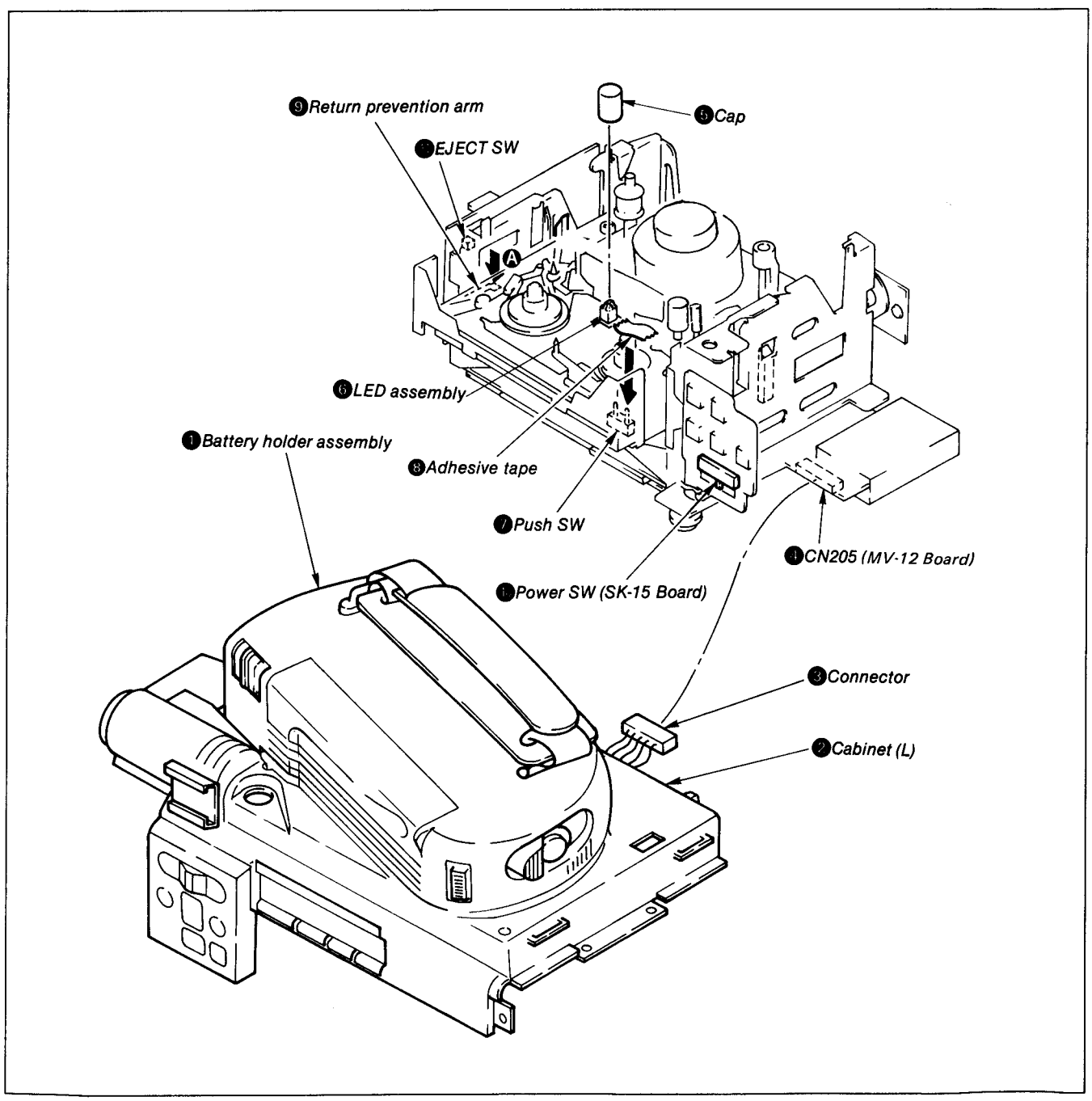


Fig. 8-6.

8-1-5. Handling of Mode Selector

•Install mode selector II panel (See Fig. 8-7)

1. Name of each section (See Fig. 8-8)

2. Connection (See Fig. 8-9.)

1) Remove connector of FP-47 flexible board with a flat-blade screwdriver, etc.
2) Insert mode selector II conversion connector.
3) Insert M-SW connector into mode selector II conversion connector.

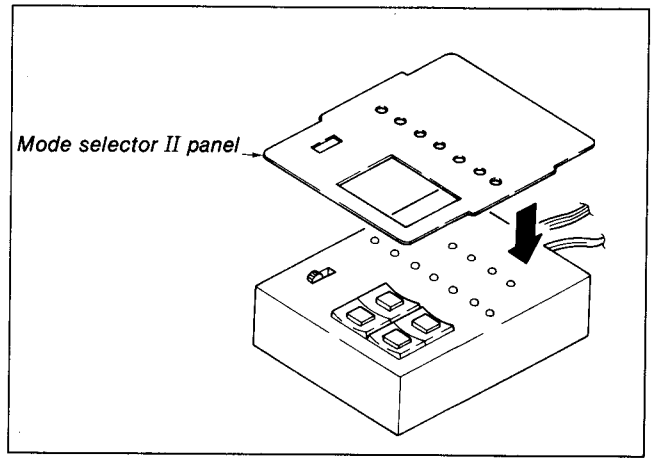


Fig. 8-7.

3. Handling

1) Use only M mode selection button.
2) When selecting, if not in individual modes, "BLANK" is lit.
3) When right side of M mode selection button is pressed continuously, the lamps are lit in the order of EJECT → USE → GUIDE LOAD → REC → READY.
4) When rendering into READY → EJECT, press the selection button on the left side to obtain the objective mode.

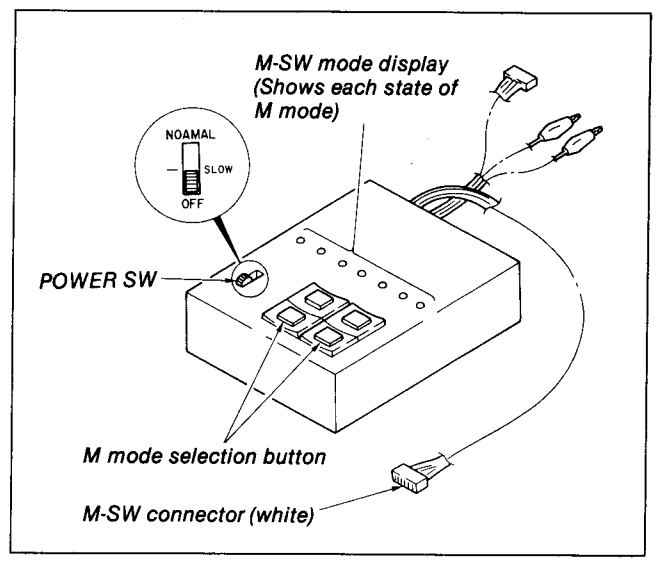


Fig. 8-8.

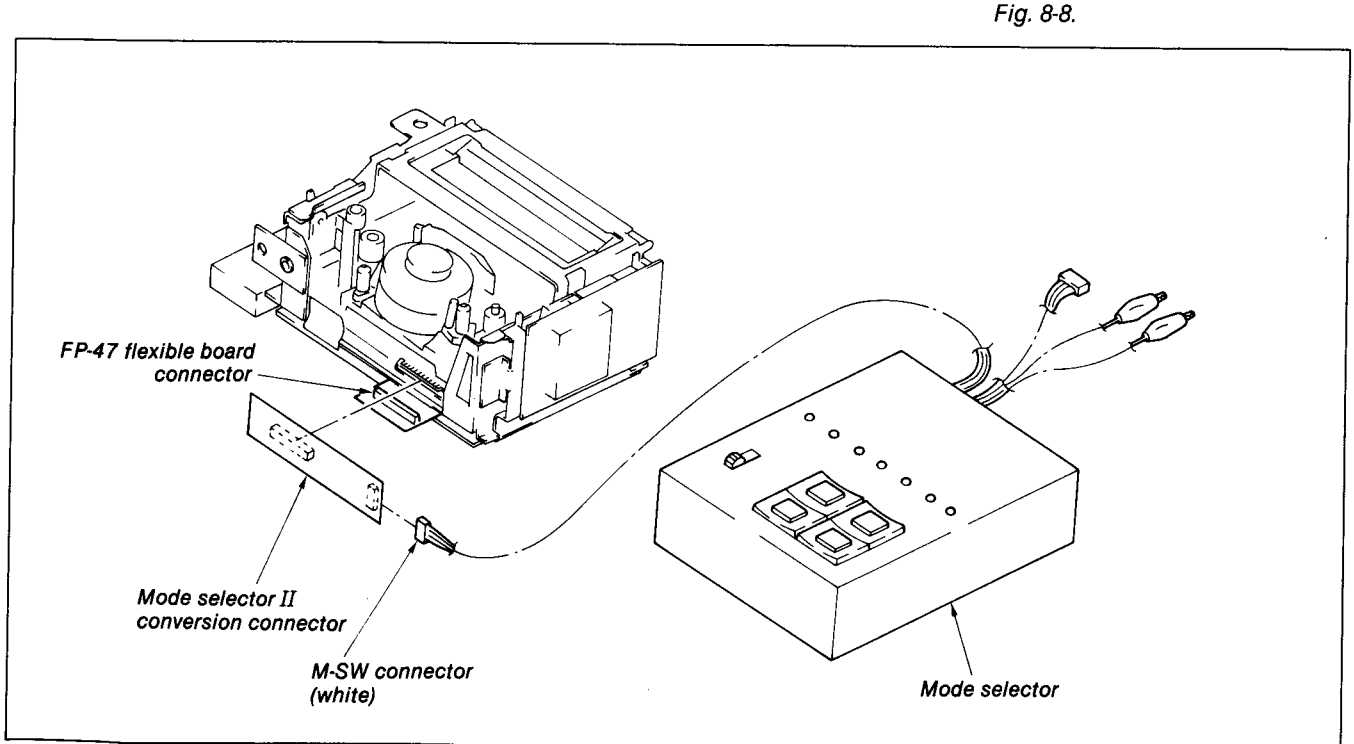
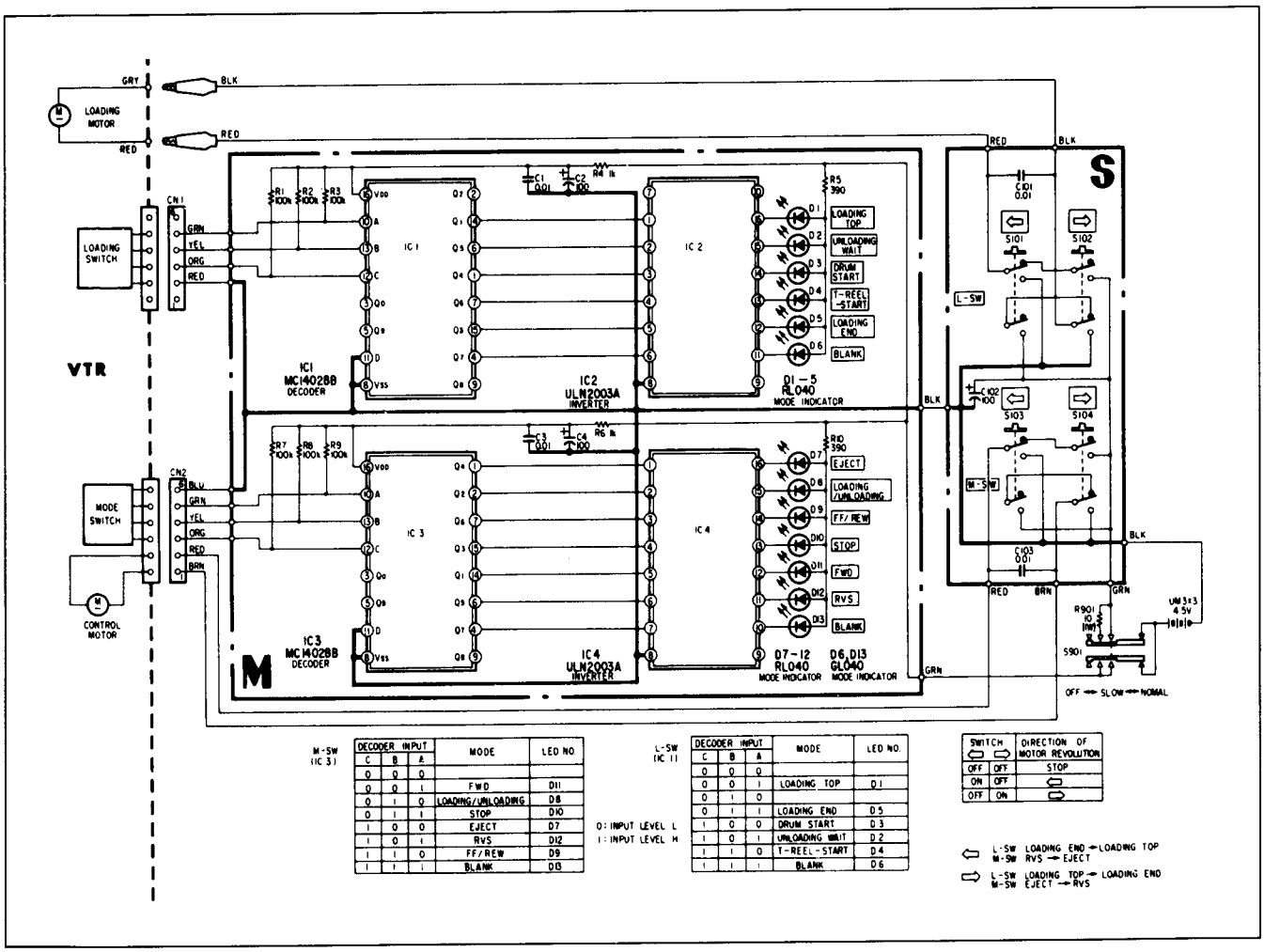


Fig. 8-9.

4. Mode selector schematic diagram



DECODER INPUT C	B	A	MODE	LED NO.
0	0	0		
0	0	1	FWD	D11
0	1	0	LOADING/UNLOADING	D8
0	1	1	STOP	D10
1	0	0	EJECT	D7
1	0	1	RVS	D12
1	1	0	FF/REW	D9
1	1	1	BLANK	D13

DECODER INPUT C	B	A	MODE	LED NO.
0	0	0		
0	0	1	LOADING TOP	D1
0	1	0		
0	1	1	LOADING END	D5
1	0	0	DRUM START	D3
1	0	1	UNLOADING WAIT	D2
1	1	0	T-REEL-START	D4
1	1	1	BLANK	D6

SWITCH ⇦	⇨	DIRECTION OF MOTOR REVOLUTION
OFF	OFF	STOP
ON	OFF	⇦
OFF	ON	⇨

5. Mode selector parts list

Ref. No	Part No.	Description		
		CAPACITOR		
C1	1-108-579-00	MILER	0.01μF	50V
C2	1-123-333-00	ELECT	100μF	24V
C3	1-108-579-00	MILER	0.01μF	50V
C4	1-123-333-00	ELECT	100μF	24V
C101	1-108-579-00	MILER	0.01μF	50V
C102	1-123-333-00	ELECT	100μF	24V
C103	1-108-579-00	MILER	0.01μF	50V
		DIODE		
D1	8-179-812-31	DIODE	RL040	
D2	8-179-812-31	DIODE	RL040	
D3	8-179-812-31	DIODE	RL040	
D4	8-179-812-31	DIODE	RL040	
D5	8-179-812-31	DIODE	RL040	
D6	8-719-812-33	DIODE	GL040	
D7	8-179-812-31	DIODE	RL040	
D8	8-179-812-31	DIODE	RL040	
D9	8-179-812-31	DIODE	RL040	
D10	8-179-812-31	DIODE	RL040	
D11	8-179-812-31	DIODE	RL040	
D12	8-179-812-31	DIODE	RL040	
D13	8-719-812-33	DIODE	GL040	

Ref. No	Part No.	Description		
		IC		
IC1	8-759-240-28	IC	TC4028BP	
IC2	8-759-120-03	IC	μPA2003A	
IC3	8-759-240-28	IC	TC4028BP	
IC4	8-759-120-03	IC	μPA2003A	
		RESISTOR		
R1	1-247-179-00	CARBON	100K	1/4W
R2	1-247-179-00	CARBON	100K	1/4W
R3	1-247-179-00	CARBON	100K	1/4W
R4	1-247-131-00	CARBON	1K	1/4W
R5	1-247-121-00	CARBON	390	1/4W
R6	1-247-131-00	CARBON	1K	1/4W
R7	1-247-179-00	CARBON	100K	1/4W
R8	1-247-179-00	CARBON	100K	1/4W
R9	1-247-179-00	CARBON	100K	1/4W
R10	1-247-121-00	CARBON	390	1/4W
R901	1-214-594-00	METAL FILM	10	1W

8-2. PERIODIC CHECK AND MAINTENANCE

• In order to fully exhibit the functions and performance of the set, carry out the following maintenance and periodic checks for the equipment and tape. In addition, after repair, carry out the following itemized maintenance irrespective of the user's length of time of usage.

8-2-1. Cleaning of Rotary Drum Assembly

1) Press a chamois cloth (Ref. No.J-2) soaked in cleaning fluid (Ref. No.J-1) lightly against the rotary drum assembly, and slowly rotate the rotary upper drum assembly counter-clockwise by hand to clean.
Note:
Do not use the power supply to rotate the motor, and do not rotate the drum clockwise by hand. Also, there is the danger of damaging the head tip if the chamois cloth is moved vertically relative to the head tip, so follow the instruction above for cleaning.

8-2-2. Cleaning of Tape Path (See Fig. 8-10.)

1) Place the cassette compartment assembly in the EJECT state, and clean the tape path (TG-1, 2, 3, 4, 5, 6 and 7, pinch roller, and capstan shaft) with a chamois cloth soaked in cleaning fluid.
Note:
Be careful lest the chamois cloth should be stained with oil or grease of each link mechanism.

8-2-3. Cleaning of Drive System

1) Clean the drive system (relay belt and surface of reel tables) with a chamois cloth soaked in cleaning fluid.

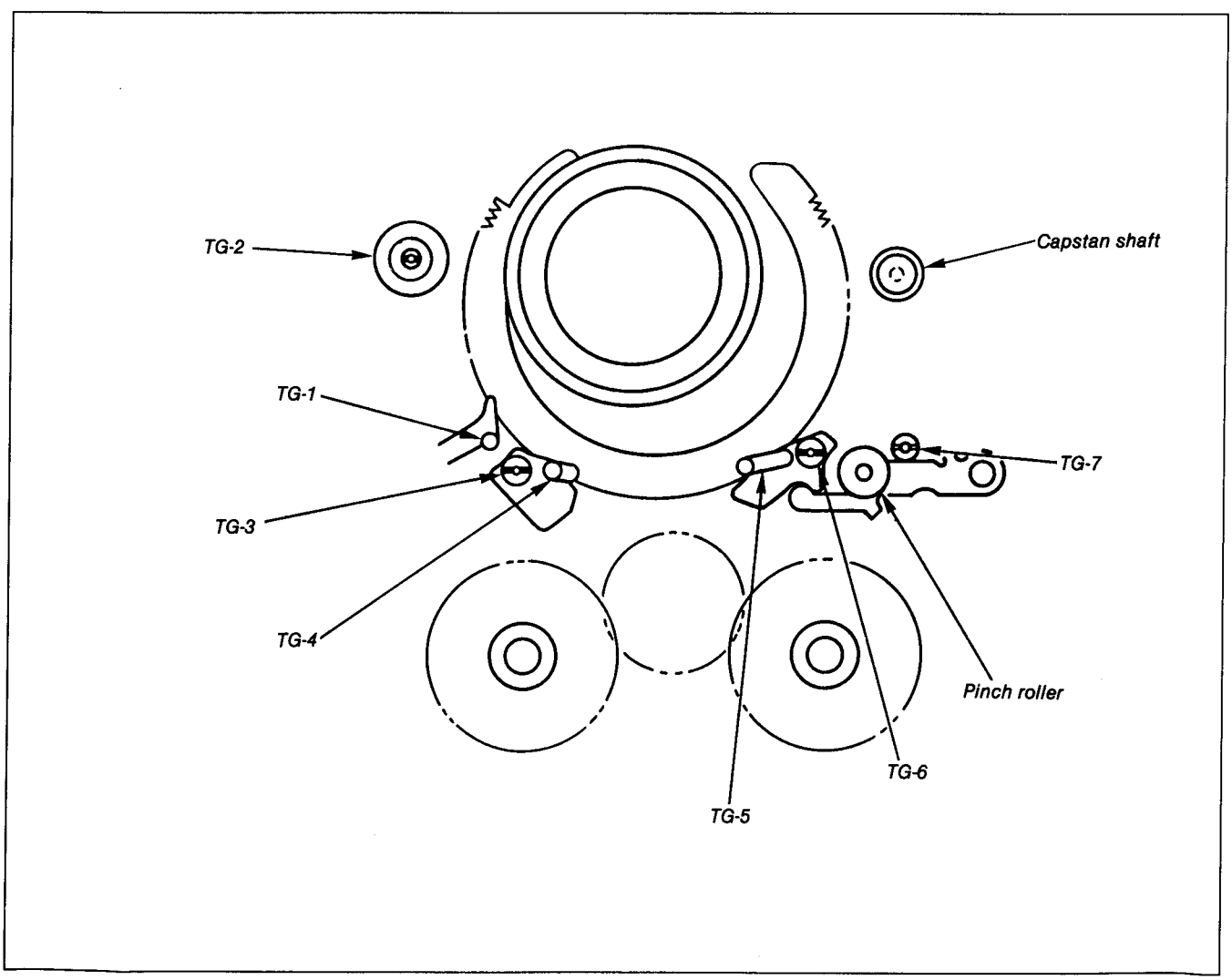


Fig. 8-10.

8-2-4. Periodic Check

	Location of Maintenance and check	Hours of Use (H)										Remarks
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape Trans-Portion System	Cleaning of tape path surface	○	○	○	○	○	○	○	○	○	○	Be careful of oil
	Cleaning and degaus-sing of rotary assembly	○	○	○	○	○	○	○	○	○	○	Be careful of oil
Driving System	Relay belt	—	☆	—	☆	—	☆	—	☆	—	☆	3-695-637-01
	Capstan shaft	—	◎	—	◎	—	◎	—	◎	—	◎	Be absolutely careful not to get oil on the tape path surface.
	Relay pulley shaft	—	◎	—	◎	—	◎	—	◎	—	◎	
	Loading motor	—	☆	—	☆	—	☆	—	☆	—	☆	8-835-222-01
Performance Confirmation	Abnormal noise	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	
	Back tension measurement	—	☆	—	☆	—	☆	—	☆	—	☆	
	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
	FWD. RVS torque measurement	—	☆	—	☆	—	☆	—	☆	—	☆	

○: Cleaning ◎: Oil ☆: Confirmation

Notes:

1) When performing overhaul, refer to the items above when replacing parts.
2) Oil
   - Be sure to use a oil authorized. (There is the danger of various troubles occuring if a different viscosity is used.)
     Oil: Parts No. 7-661-088-61 (MITSUBISHI Diamond Oil HYDROFLUD NT-68)
   - Be absolutely sure to use clean oil without any mixture of dust, etc. when lubricating the shaft bearing. (There is the danger of wear and burning if dirty oil is used with a mixture of dust, etc.)
   - One drop of oil means the amount which sticks to a 2mm diameter rod, as shown in figure. (See Fig. 8-11)

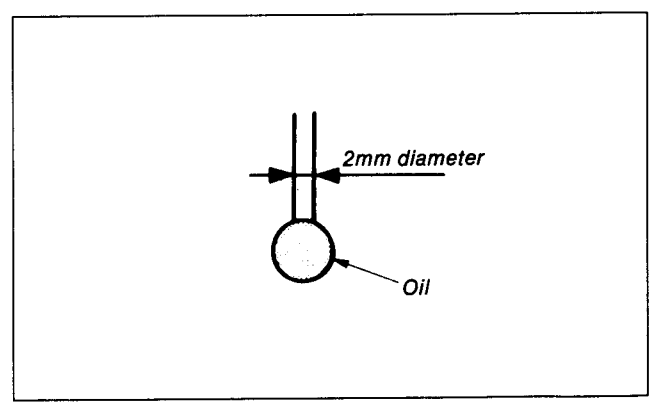
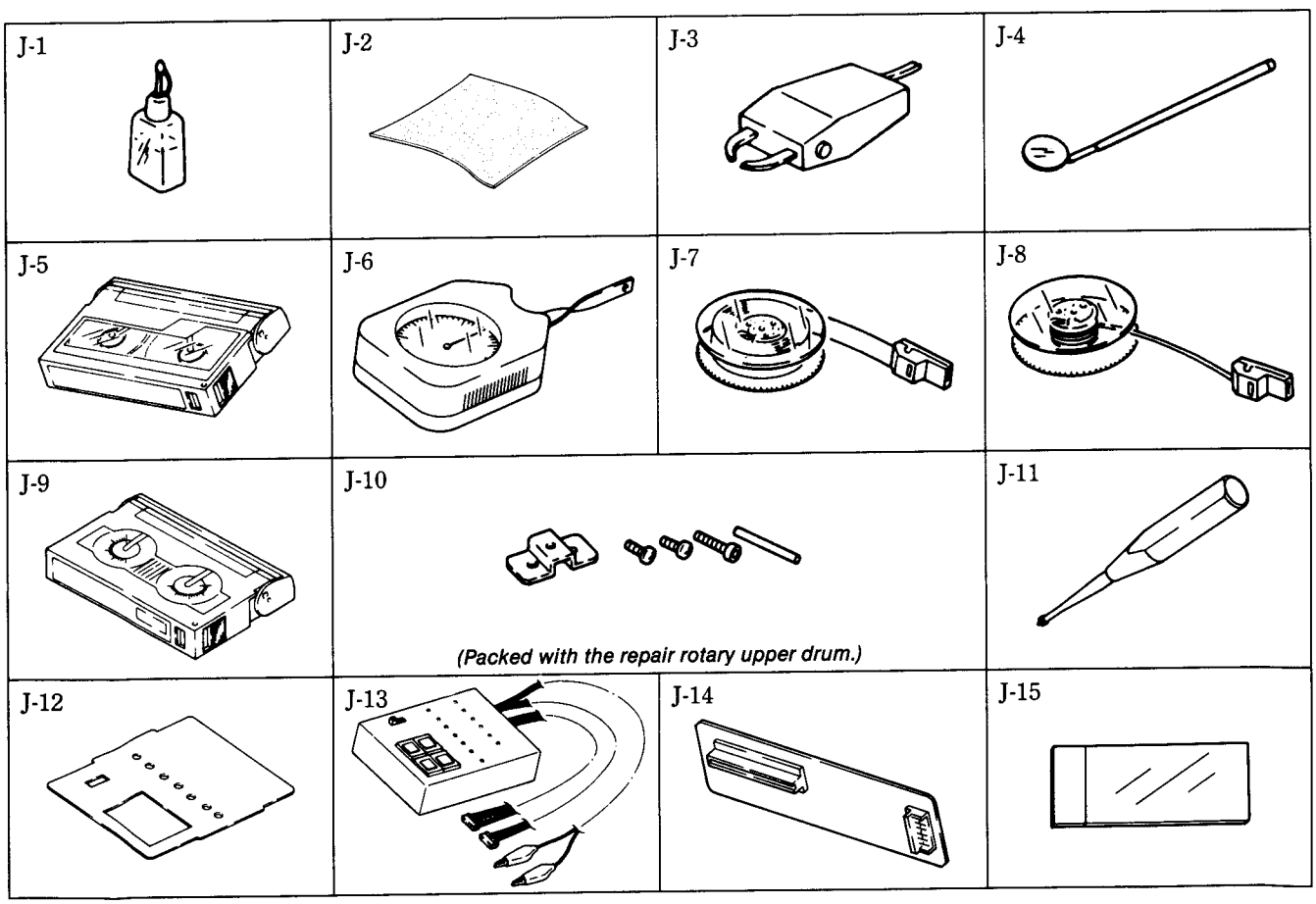


Fig. 8-11.

8-2-5. Service Jig Table

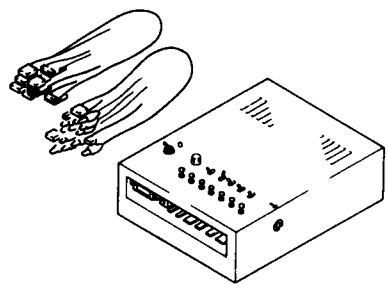
Ref No.	Name	Part No.	Fixture No.	Usage and Others
J-1	Cleaning fluid	Y-2031-001-0		
J-2	Chamois cloth	2-034-697-00		
J-3	Head degausser	Widely available		
J-4	Small mirror for adjustment Spare mirror	J-6080-029-A J-6080-030-1	SL5052	Tape path
J-5	Alignment tape (WR5-1C)	8-967-995-06		Tape path
J-6	Dial tension gauge	J-6080-827-A		Various torque measurement
J-7	Tension measurement reel	J-6080-831-A		With ϕ30 tape
J-8	Tension measurement reel	J-6080-832-A		With ϕ16 string
J-9	FWD and RVS winding torque cassette	J-6080-624-A	GD-2086	
J-10	Rotary drum jig	(Packed with the repair rotary upper drum)		
J-11	Screwdriver for tape path	J-6080-811-A		For tape guide adjustment
J-12	Mode selector II panel	J-6080-844-A		
J-13	Mode selector	J-6080-825-A		For all models
J-14	Mode selector II conversion connector	J-6080-845-A		
J-15	Tape end detecting filter	J-6080-848-A		Tape end detecting adjustment

Other equipment ●Oscilloscope
●Analog tester (20kΩ)

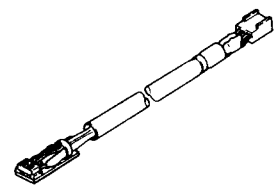


Ref No.	Name	Part No.	Usage and Others
J-16	TRACK SHIFT & MONITOR JIG	J-6080-843-A	Tape path
J-17	RF/SWP connector	J-6080-843-2	TRACK SHIFT & MONITOR JIG connection cable
	CTL connector	J-6080-843-2	
J-18	POWER SUPPLY connector	J-6080-843-1	

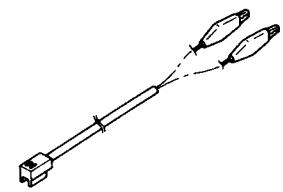
J-16



J-17



J-18



8-3. MECHANICAL CHECK, ADJUSTMENT AND REPLACEMENT

Note:

- Use the mode selector (Ref. No. J-13) for this mechanical check, adjustment and replacement.
- The mode inside the ▭ is the mode set by pressing the mode selector button.

8-3-1. Reel Lock Lever Assembly (See Fig. 8-12)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) Remove tension spring ❶ from notch ❹.
3) Remove stopper washer ❷ and remove reel lock lever assembly ❶ from claw ❸ and shaft ❺.

2. Installation

1) Install reel lock lever assembly ❶ to shaft ❺ and fixed it to stopper washer ❷.
2) Hook the tension coil spring ❶ to notch ❹.
3) By referring to 8-1-1 and 8-1-2, install the cassette arm assembly and LS cassette compartment.

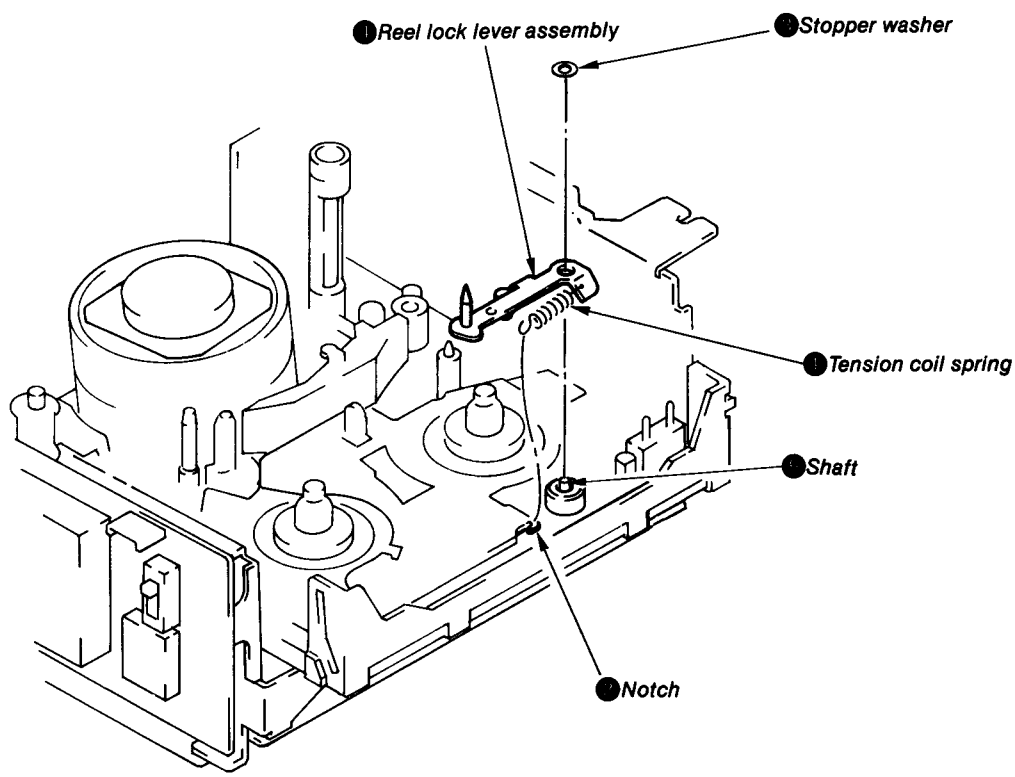


Fig. 8-12.

8-3-2. Pendulum Stopper Plate (See Fig. 8-13.)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove the cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) Pushing the claw ❼ of the LED assembly ❶ in the direction of arrow Ⓐ, lift and remove the LED assembly ❶, and then, remove the claw ❷.
4) Remove two screws ❸ and ❶.
5) Remove pendulum stopper plate ❻ from the two positions of claws ❺.

Note:

Since the claw ❼ is easily deformed or broken by too strong pushing force, mount and dismount carefully.

2. Installation

1) Set in [READY] mode.
2) See to it that the LED assembly ❶ is mounted on the pendulum stopper plate ❻ and fasten to two positions of the claw ❺ and two positions of the dowel ❾.
3) Install two screws ❸ and ❶.
4) Hook claw ❷ of LED assembly ❶ and insert by pushing in the direction of arrow Ⓑ.
5) Set to [EJECT] mode.
6) By referring to 8-3-1, install the reel lock lever assembly.
7) By referring to 8-1-1 and 8-1-2, install the cassette arm assembly and LS cassette compartment assembly.

Note:

- Caution should be taken that the TG-1 band assembly ❽ is not clasped in when installing the pendulum stopper plate ❻.
- In other modes than [READY], the band becomes loose.

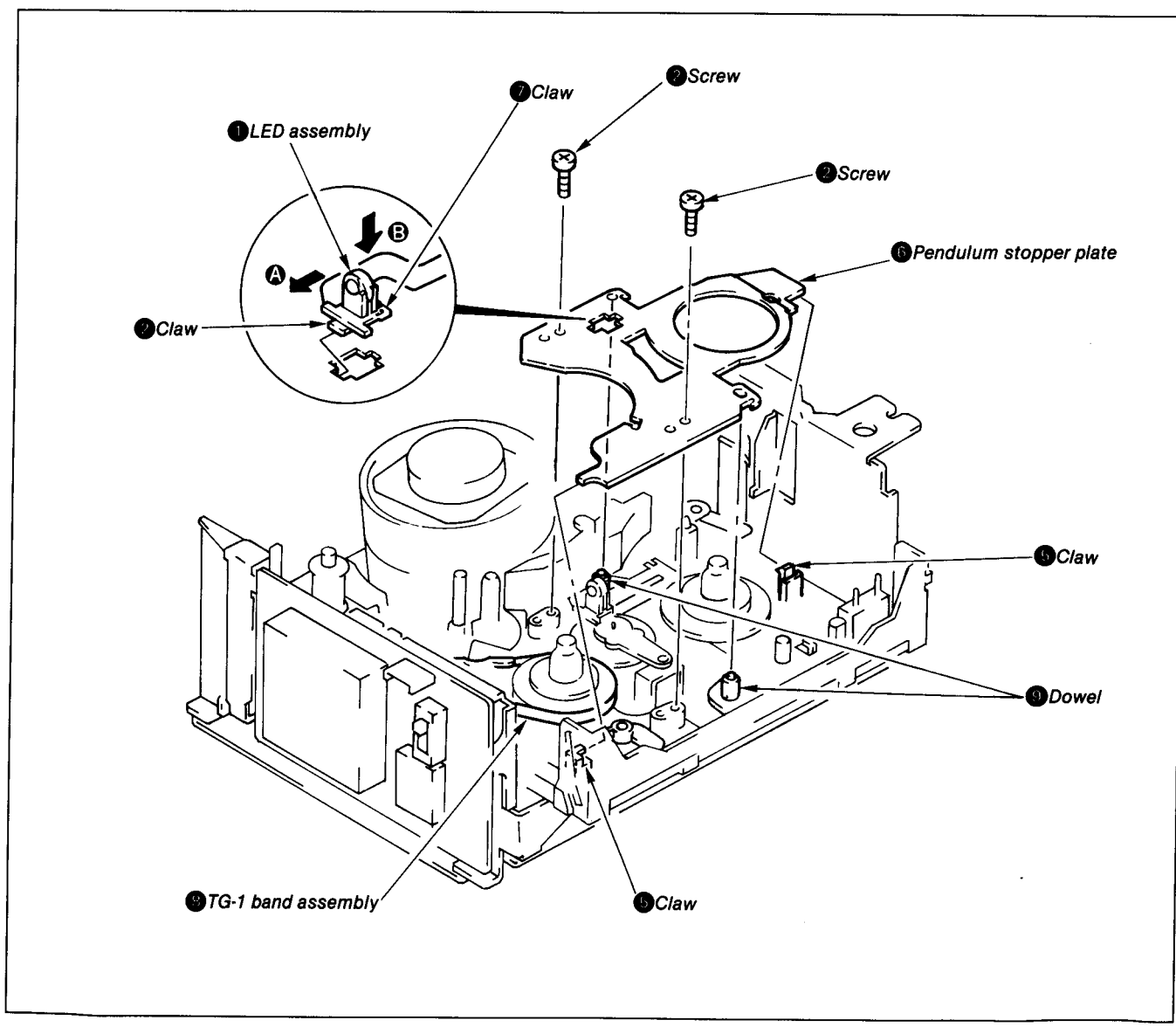


Fig. 8-13.

8-3-3. S Reel Table Assembly (See Fig. 8-14)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove pendulum stopper plate.
4) Remove screw ❶, and remove one side of TG-1 band assembly ❷.
5) Move the soft brake ❸ in the direction of arrow Ⓐ.
6) Remove S reel table assembly ❶.

Note:

Perform removal of S reel table assembly ❶ by holding the ✱ marked section of reel claw.

2. Installation

1) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft ❺ as in Fig. A.
2) Move soft brake ❸ in the direction of arrow Ⓐ.
3) Install S reel table assembly ❶ to the shaft.
4) Install screw ❶ to TG-1 band assembly ❷ in the 2) state.
5) By referring to 8-3-2, install pendulum stopper plate.
6) By referring to 8-3-1, install reel lock lever assembly.
7) By referring to 8-1-1, install cassette arm assembly and LS cassette compartment assembly.

Note:

By referring to 8-3-26, perform check of reel table height.

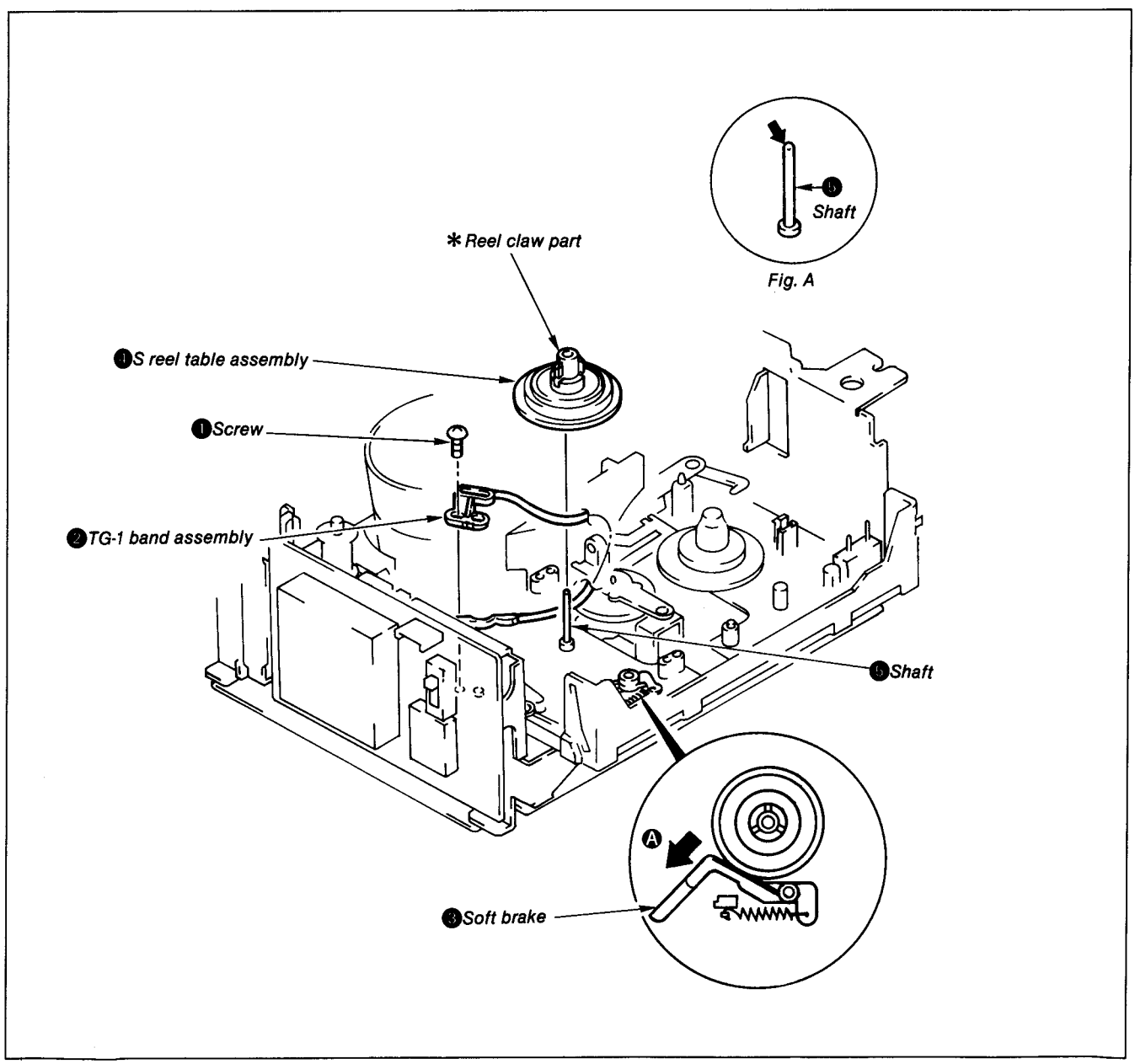


Fig. 8-14.

8-3-4. T Reel Table Assembly (See Fig. 8-15)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove the cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove pendulum stopper plate.
4) Remove T reel table assembly ❶.

Note:

Perform removal of T reel table assembly ❶ by holding the reel claw section marked with ✱ .

2. Installation

1) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft ❷, as in Fig. A.
2) Install T reel table assembly ❶ to shaft ❷.
3) By referring to 8-3-2, install pendulum stopper plate.
4) By referring to 8-3-1, install reel lock lever assembly.
5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

Note:

By referring to 8-3-26, perform check of reel table height.

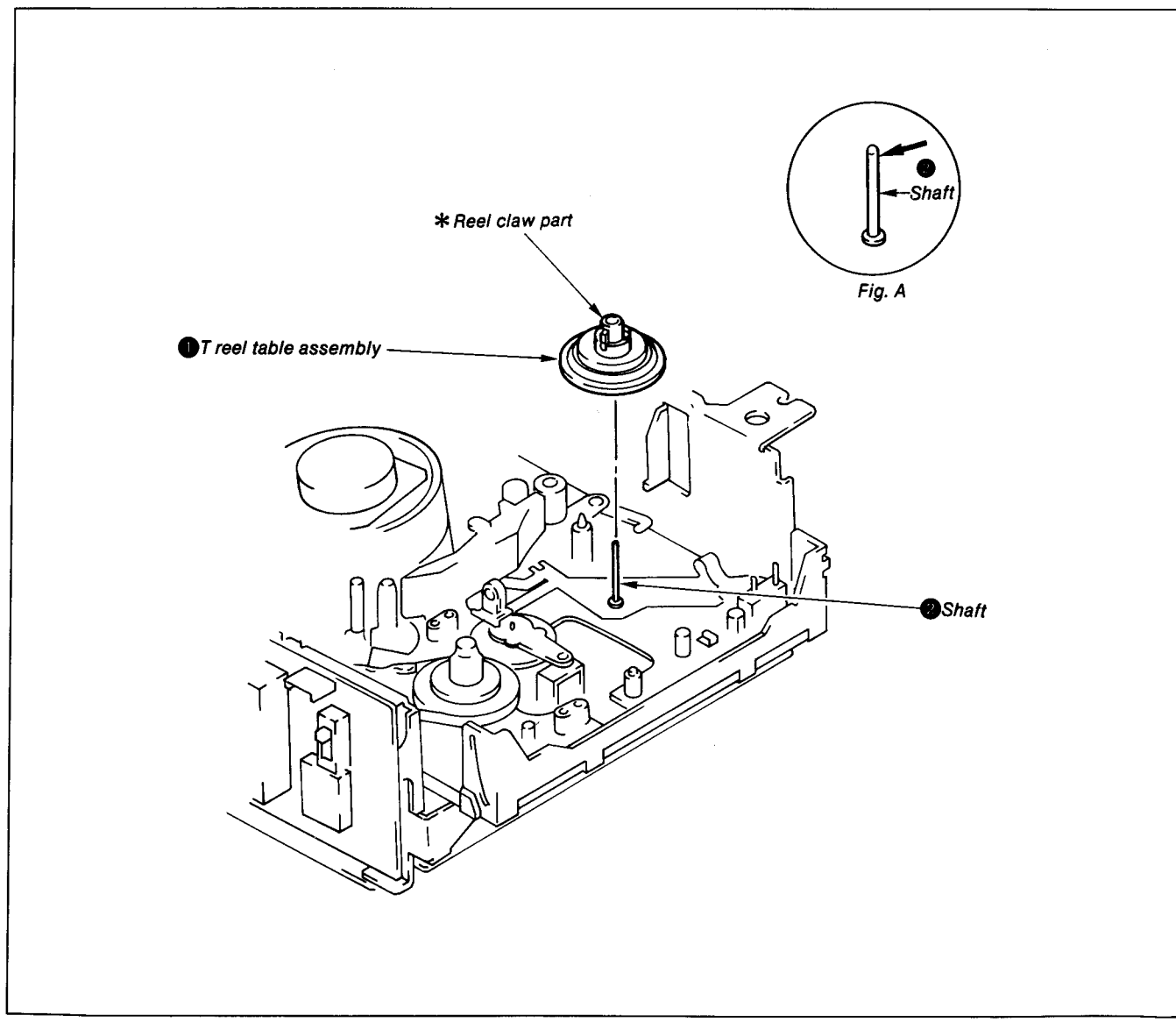


Fig. 8-15.

8-3-5. Pinch Arm B Assembly (See Fig. 8-16)

1. Removal

1) By referring to 8-3-1, and 8-3-2, remove cassette arm assembly, and LS cassette compartment.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove pendulum stopper plate.
4) By referring to 8-3-4, remove T reel table assembly.
5) Remove tension coil spring ❶ from claw ❷.
6) Remove stopper washer ❸, and remove pinch arm B assembly ❹.

2. Installation

1) Apply molten grease to the arrow section of pinch arm B assembly ❹, as shown in Fig. A.
2) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft ❺, as shown in Fig. B.
3) See to it that pinch arm B assembly ❹ pin enters hole ❻ and pinch arm A ❼, and install to shaft ❺.
4) Install stopper washer ❸.
5) Hook the tension coil spring ❶ onto claw ❷.
6) By referring to 8-3-4, install T reel table assembly.
7) By referring to 8-1-2, install pendulum stopper plate.
8) By referring to 8-3-1, install reel lock lever assembly.
9) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

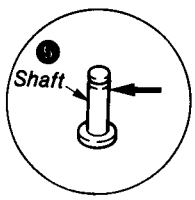


Fig. B

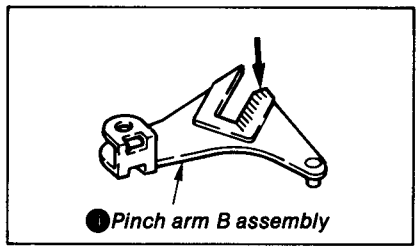
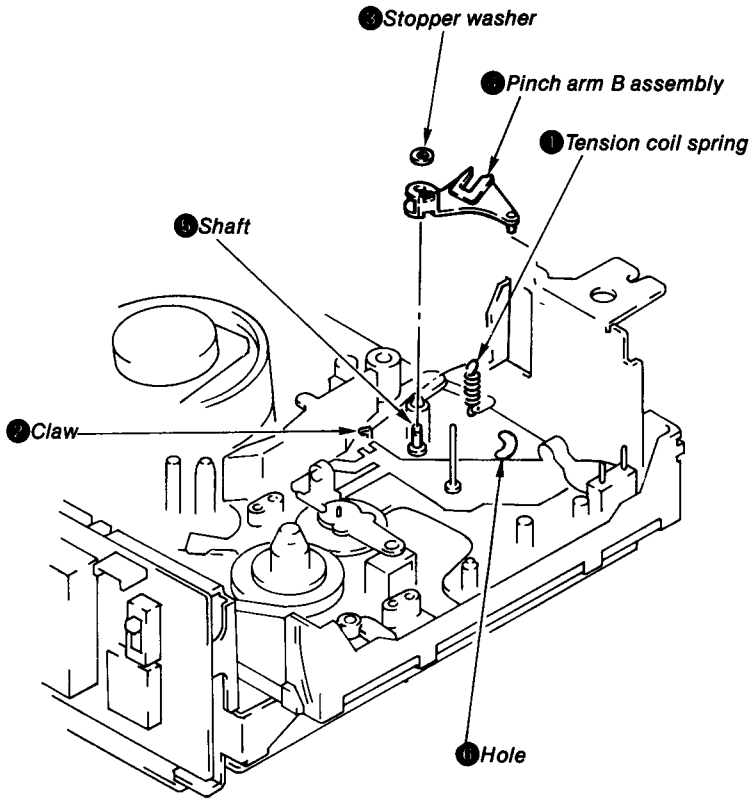


Fig. A



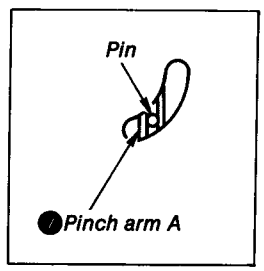


Fig. C

Fig. 8-16.

8-3-6. Pinch Arm C Assembly (See Fig. 8-17)

1. Removal

1) By referring to 8-1-1 and 8-1-1, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove pendulum stopper plate.
4) Remove tension coil lever ❶ from claw ❷.
5) Remove stopper washer ❸, and remove pinch arm C assembly ❹ and pinch lever assembly ❺.
6) Remove tension coil spring ❻, and disassemble pinch arm C assembly ❹ and pinch lever assembly ❺.

Note:

Do not touch the roller section marked with ✻.

2. Installation

1) Apply over 1/3 drop and below 1/2 drop oil to the arrow section of shaft ❼, as shown in Fig. A.
2) Install pinch lever assembly ❺ to pin arm C assembly ❹, and hook on tension coil spring ❻.
3) Install pinch arm C assembly ❹ and pin lever assembly ❺ to shaft ❼.
4) Install stopper washer ❸.
5) Hook tension coil spring ❶ to claw ❷.
6) By referring to 8-3-2, install pendulum stopper plate.
7) By referring to 8-3-1, install reel lock lever assembly.
8) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

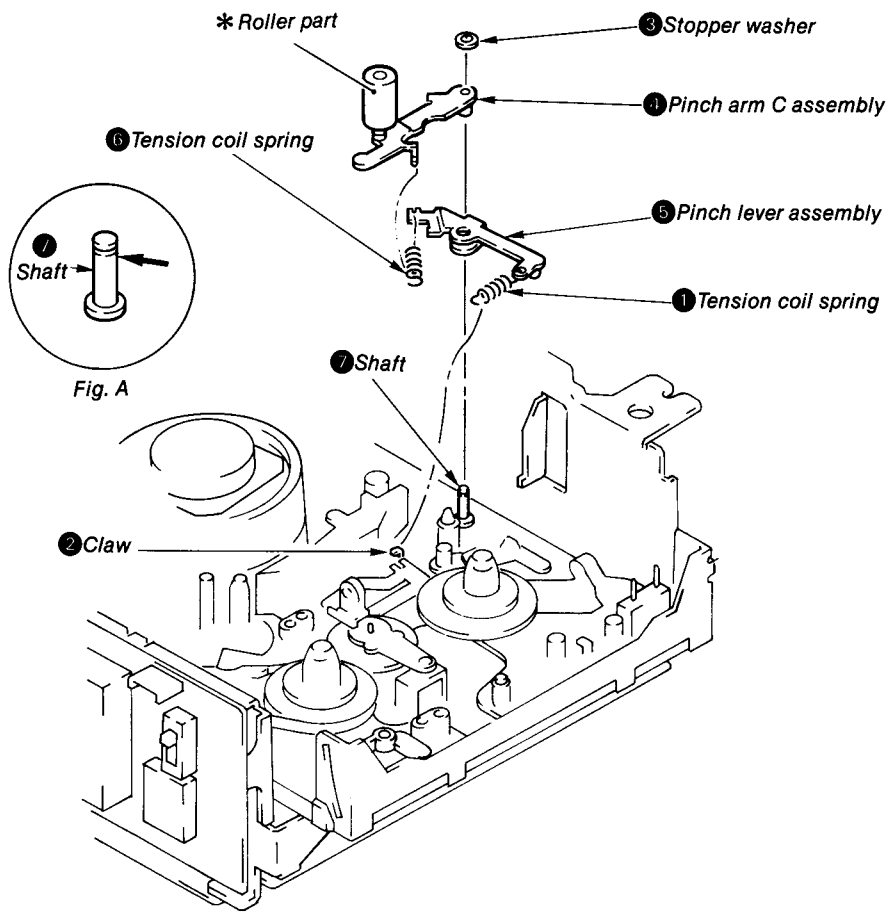


Fig. 8-17.

8-3-7. TG-1 Arm Assembly (See Fig. 8-18)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove pendulum stopper plate.
4) Remove stopper washer ❶, and remove 1 screw ❷.
5) Remove tension coil spring ❸, and remove TG-1 arm assembly ❹.

Note:

Do not touch the shoe section marked with ✻, (see Fig. 8-19) and guide section marked with ✻.

2. Installation

1) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft ❺, as shown in Fig. A.
2) Install TG-1 arm assembly ❹ to shaft ❺. (Do not touch the guide section)
3) Move soft brake ❻ in the direction of arrow Ⓒ, wind the TG-1 band assembly ❽ around the outer circumference of S reel table assembly ❼, and install 1 screw ❷.
4) Install stopper washer ❶.
5) Hook tension coil spring ❸ onto the position indicated in Fig. B.
6) By referring to 8-3-2, install pendulum stopper plate.
7) By referring to 8-3-1, install reel lock lever assembly.
8) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

Notes:

1) Be careful so as not to have any curving in the TG-1 band assembly ❽.
2) By referring to 8-3-28, perform tension regulator position adjustment.
3) By referring to 8-3-29, perform FWD back tension adjustment.

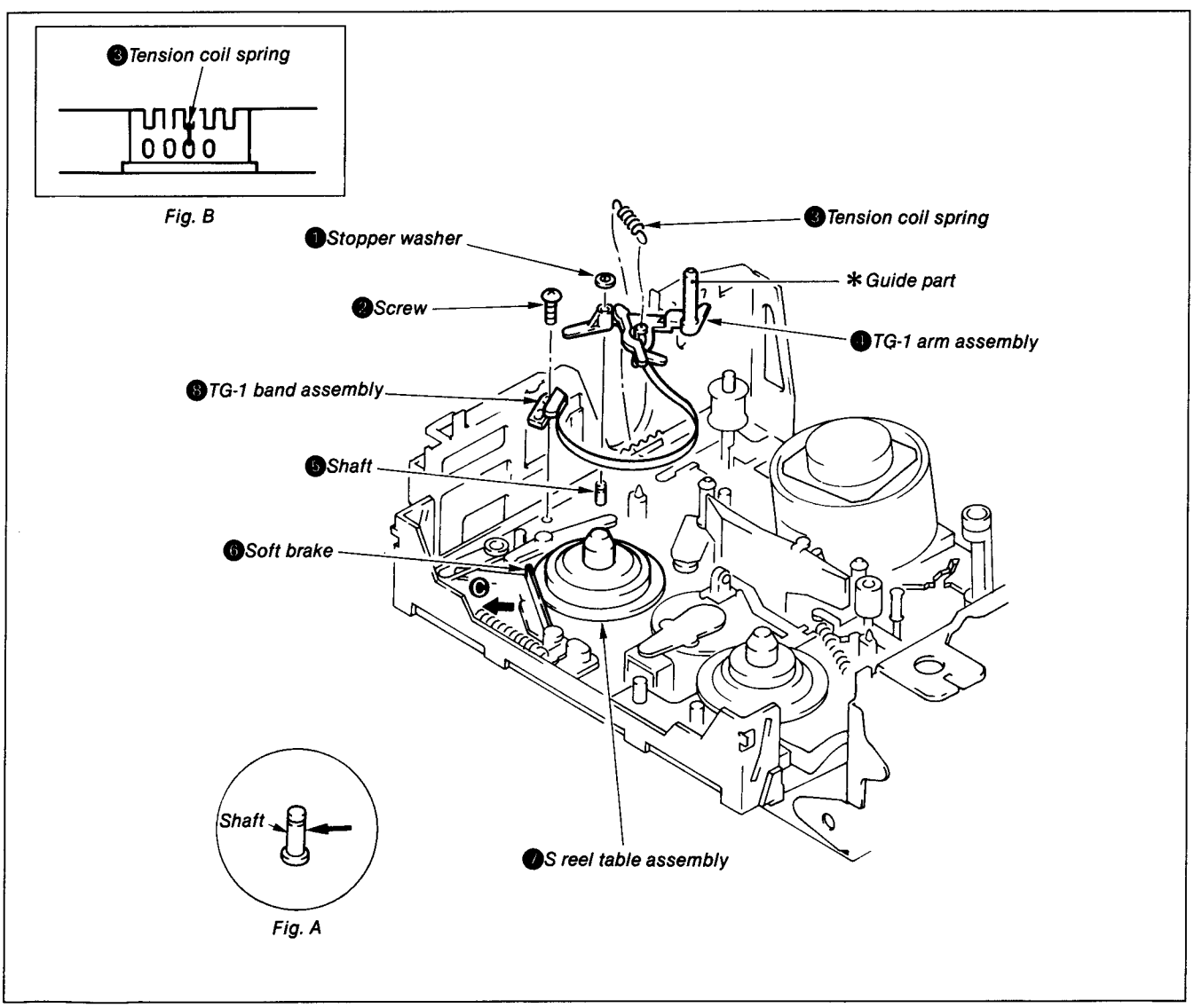


Fig. 8-18.

8-3-8. TG-1 Band Assembly (See Fig. 8-19)

1. Removal

1) By referring to 8-3-7, remove TG-1 arm assembly.
2) Remove claw ❷, of TG-1 band assembly from TG-1 arm assembly ❸.

2. Installation

1) Install claw ❷ of TG-1 band assembly ❶ into hole of TG-1 arm assembly ❸.
2) Confirm that the TG-1 band assembly ❶ rotates smoothly centering around the hole of the TG-1 arm assembly ❸.
3) By referring to 8-3-7, install TG-1 arm assembly.

Notes:

1) Be careful so as not to have any curving in the TG-1 band assembly ❶.
2) Do not touch the shoe section marked with ✱ and guide section marked with ✱.

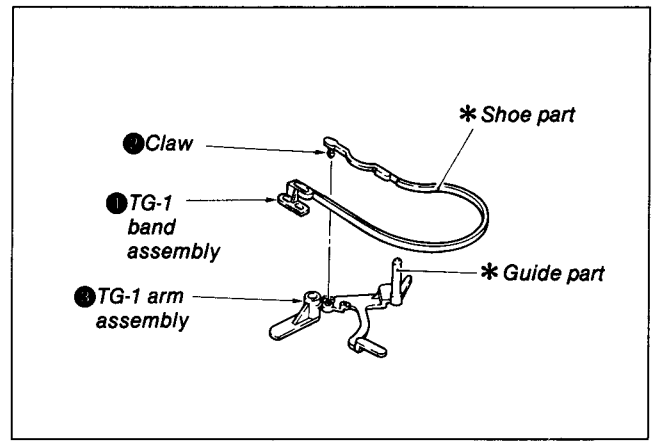


Fig. 8-19.

8-3-9. Soft Brake Assembly (See Fig. 8-20)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove pendulum stopper plate.
4) Remove tension coil spring ❶ from claw ❷.
5) Remove soft brake assembly ❸. (See Fig. 8-20)

2. Installation

1) Install soft brake assembly. At this time place the Ⓐ section under the LS plate spring ❶.
2) Hook tension coil spring ❶ onto claw ❷.
3) By referring to 8-3-2, install reel lock lever assembly.
4) By referring to 8-3-1, install reel lock lever.
5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

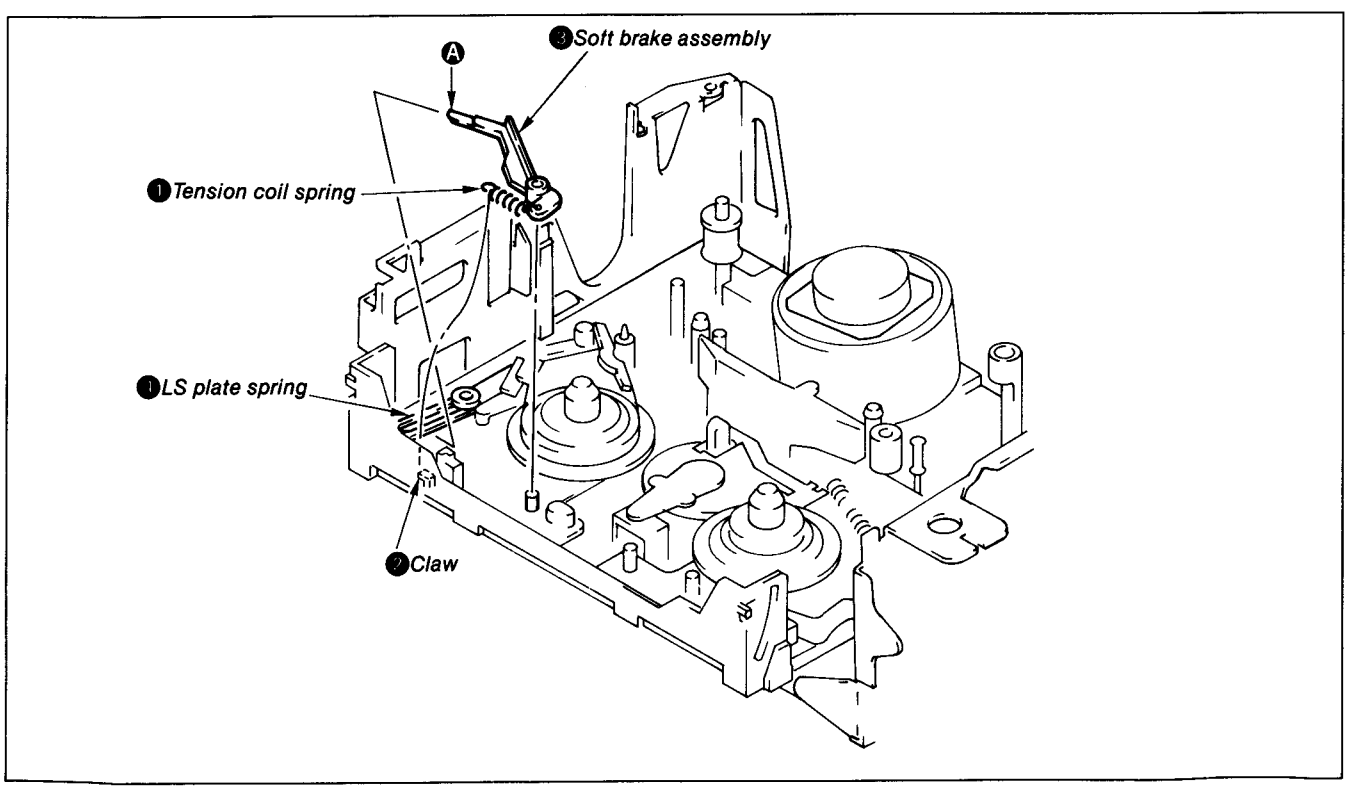


Fig. 8-20.

8-3-10. LS Chassis Assembly (See Fig. 8-21)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) Set to GUIDE LOAD after BLANK.
3) Remove stopper washer ❶.
4) Remove three each of screws ❷ and LS guide ❸.
5) Remove LS chassis assembly ❹ in the direction of arrow Ⓐ.
6) Remove 7 sections of the soldered sections ❻ of FP-53 flexible board ❺ with a soldering iron, as shown in Fig. A. and remove FP-53 flexible board ❺ which is stuck to the mechanical chassis.

2. Installation

1) Peel off tape attached to the rear of FP-53 flexible board ❺, and stick on by matching the shaft of the mechanical chassis with the pattern.
2) Solder the sections of the FP-53 flexible board ❺, as shown in Fig. B.
3) Apply molten grease to the arrow section of LS chassis assembly ❹, as shown in Fig. C.
4) Move reel lock lever assembly ❻ in the direction of arrow Ⓔ, and install by matching the four positions of the attachment holes of LS chassis assembly ❹ with the shaft of the mechanical chassis.
5) Engage two positions of claw ❼ to drum base.
6) Move TG-7 arm assembly ❽ in the direction of arrow Ⓕ, (gently with tweezers, etc.), and insert into the hole of the mechanical chassis.
7) Insert pin ❽ of LS gear assembly to slot ❾ of LS cam plate, as shown in Fig. D.
   Note:
   Confirm that mechanical chassis assembly parts have been properly assembled.
8) Confirm that it is completely installed, and install three each of LS guides ❸ and screws ❷ respectively.
9) Install stopper washer ❶.
10) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.
    Note:
    Perform the soldering rapidly.

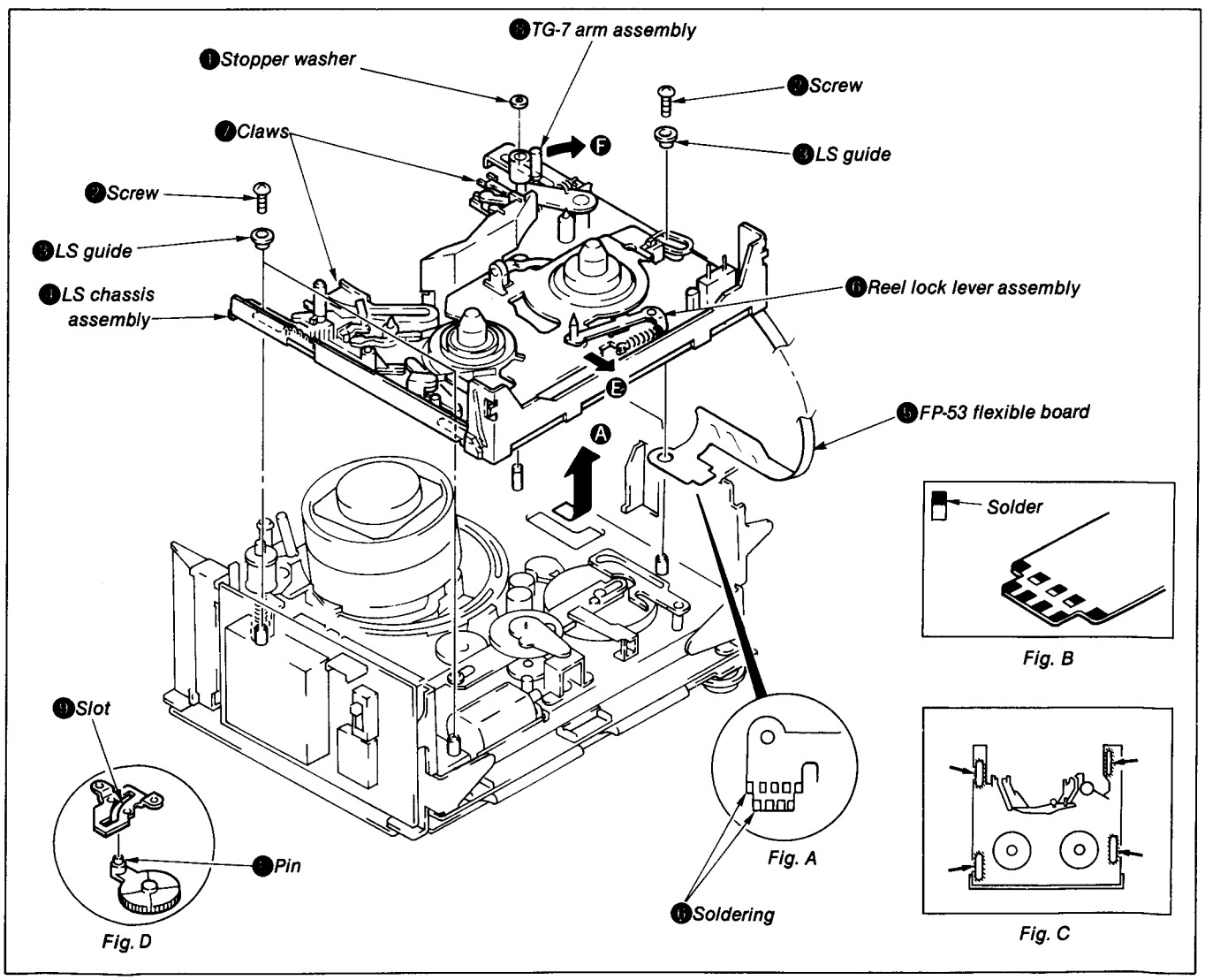


Fig. 8-21.

8-3-11. TG-7 Arm Assembly (See Fig. 8-22.)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) Turn over LS chassis assembly.
4) Remove stopper washer ❶ (t=0.3mm).
5) Remove TG-7 spring ❷ from claw ❸, and remove TG-7 arm assembly ❶.

Note:

1) As the FP-53 flexible board ✱ is connected to the mechanical chassis, caution should be taken that it is not broken off.
2) Be careful not to deform the TG-7 arm.

2. Installation

1) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft, as shown in Fig. A.
2) Install TG-7 arm assembly ❶ by way of TG-7 spring ❷.
3) Hook TG-7 spring ❷ onto claw ❸.
4) Install stopper washer ❶.
5) By referring to 8-3-10, install LS chassis assembly.
6) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.
7) Perform presetting of guide block height (Refer 8-4 TAPE PATH ADJUSTMENT).

Note:

Confirm that stopper washer ❶ is completely inserted into the notch of the shaft.

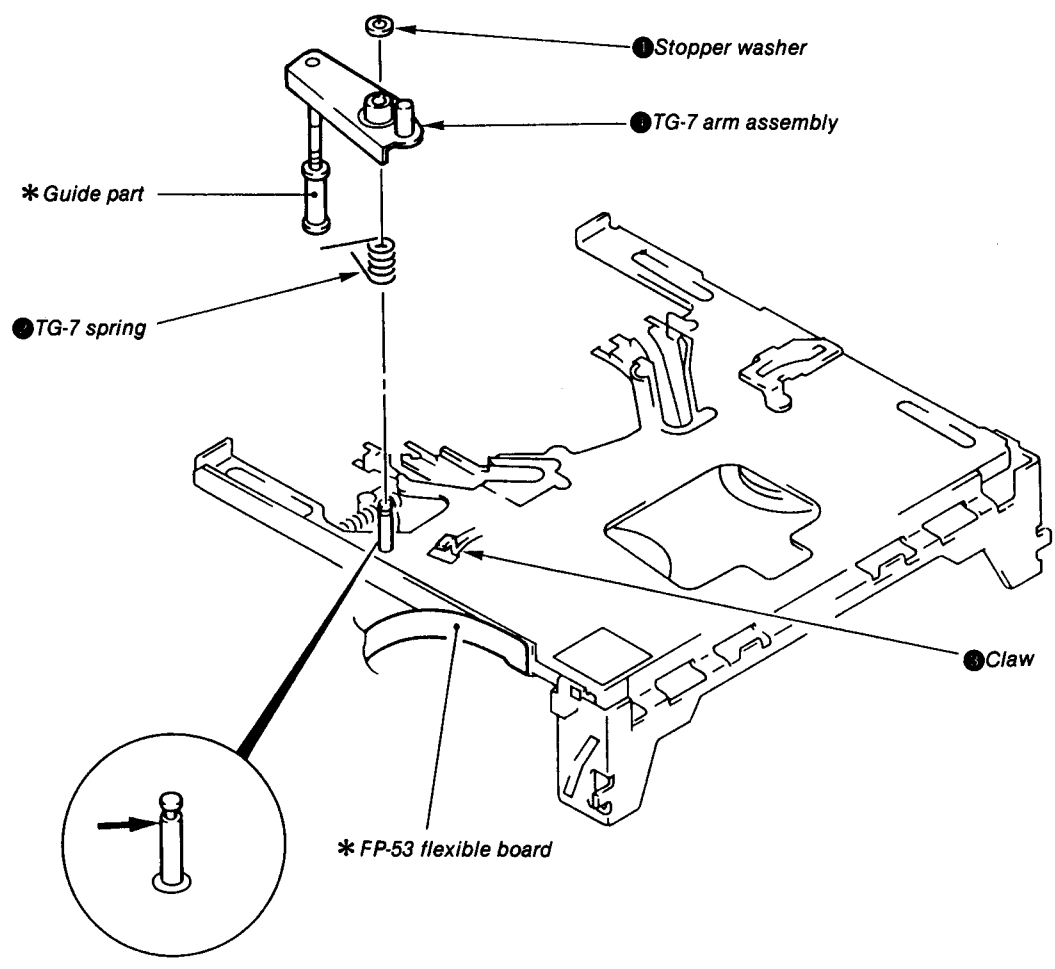


Fig. 8-22.

8-3-12. Pinch Arm A Assembly (See Fig. 8-23)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) Remove stopper washer ❶.
4) Remove pinch arm A assembly ❷.

2. Installation

1) Apply over 1/3 drop and below 1/2 drop of oil to arrow section of shaft, as shown in Fig. A.
2) Apply molten grease to arrow section of pinch arm A assembly ❷, as shown in Fig. B.
3) Insert pin of pinch arm A assembly ❷ into outer notch of cam assembly ❸, and install to shaft.
4) Install stopper washer ❶.
5) By referring to 8-3-10, install LS chassis assembly.
6) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

Note:
Confirm that stopper washer ❶ is completely inserted into shaft.

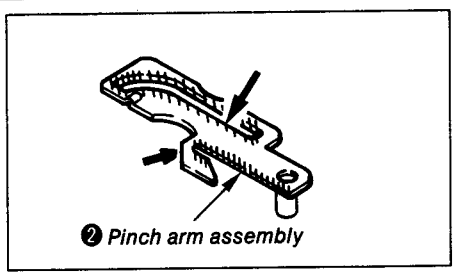


Fig. B

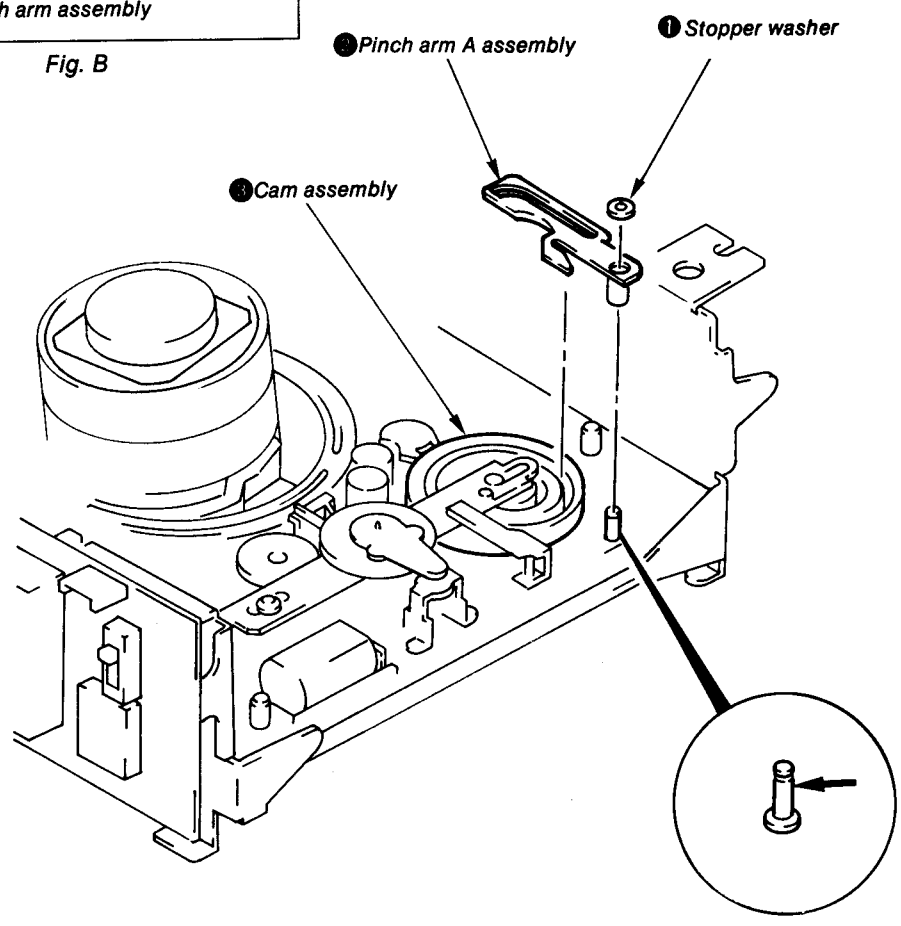


Fig. A

Fig. 8-23.

8-3-13. M Slider Assembly (See Fig. 8-24)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove the cassette arm assembly and LS cassette assembly.
2) By referring to 8-3-10, remove the LS chassis.
3) Remove pendulum gear arm.
4) Remove E ring ❷ and remove reel lock lever B ❸.
5) Remove stopper washer ❹.
6) Remove stopper washer ❺ and M slider assembly ❻.

2. Installation

1) Apply molten grease to the arrow marked point of M slider assembly ❻, as shown in Fig. A.
2) Insert pin of the M slider assembly ❻ into the inner notch of cam assembly ❼ and install.
3) Remove stopper washer ❺ and stopper washer ❹.
4) Apply molten grease to the arrow marked point of reel lock lever B ❸, as shown in Fig. B.
5) Apply over 1/3 drop and below 1/2 drop of oil to the arrow marked point on the shaft, as shown in Fig. C and E.
6) Install reel lock lever so as to be inserted in between the bent-up part and pin, as shown in Fig. D.
7) Install E ring ❷.
8) Apply over 1/3 drop and below 1/2 drop of oil to the shaft of relay base assembly ❾.
9) Install pendulum gear arm ❶.
10) By referring to 8-3-10, install LS chassis assembly.
11) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

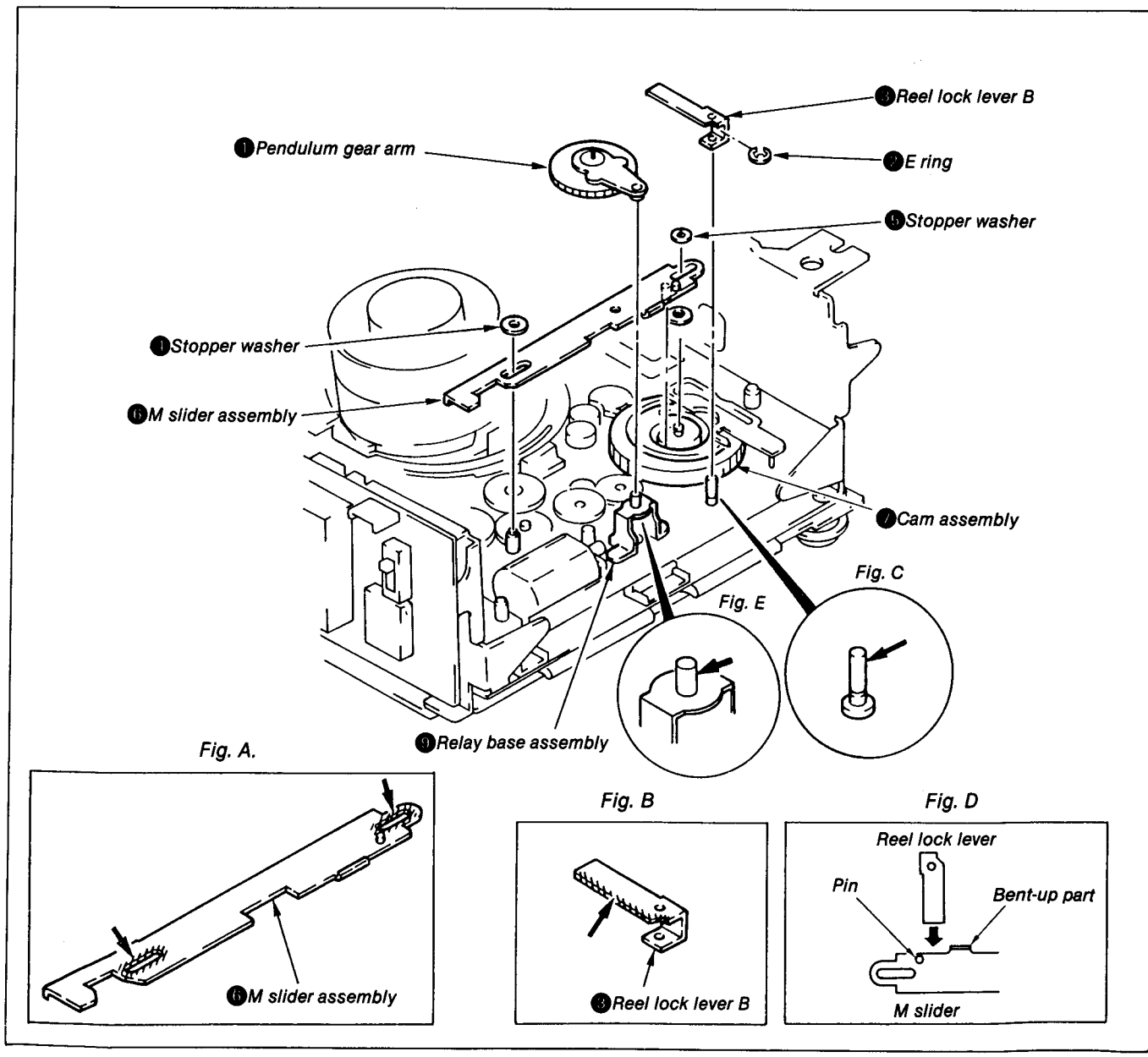


Fig. 8-24.

8-3-14. TG-4 Base Assembly and TG-5 Base Assembly

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) Set into GUIDE LOAD mode and remove TG-4 base assembly ❶ and TG-5 base assembly ❷ from the groove of the drum base.
4) Remove the TG-4 base assembly from the notch ❸ by turning around section the upper of pin ❺ in the direction of arrow Ⓐ by centering pin ❹ of the TG-4 base assembly ❶. (See Fig. 8-25.)
5) Remove pin ❺ from the hole of notch ❸.
6) Remove TG-5 base assembly ❷ from notch ❼ by moving it in the direction of arrow Ⓐ (See Fig. 8-26)
7) Remove TG-5 base assembly ❷ from pin ❻. (See Fig. 8-27)

Note:
Be sure not to contact with the guide section marked with ✱.

2. Installation

1) Insert pin ❻ into the hole of TG-5 base assembly ❷.
2) Insert TG-5 base assembly ❷ beneath notch ❼ by moving it in the direction of arrow B.
3) Insert pin ❺ of TG-5 base assembly ❶ into the hole of notch ❸.
4) Set pin ❹ of TG-4 base assembly ❶ into notch ❸ by turning it in the direction of arrow Ⓑ.
5) Confirm that the TG-4 base assembly ❶ and TG-5 base assembly ❷ have been installed in the states as shown in Fig. A and B respectively.
6) Set TG-4 base assembly ❶ and TG-5 base assembly ❷ into the groove of the drum base while slowly turning BLANK after GUIDE LOAD mode. If the position are not matched, the assembly is caught by the entrance of the groove and, accordingly, it may be unable to move. Therefore, be sure to set it into the groove while matching the positions very carefully.
7) By referring to 8-3-10, install LS chassis assembly.
8) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

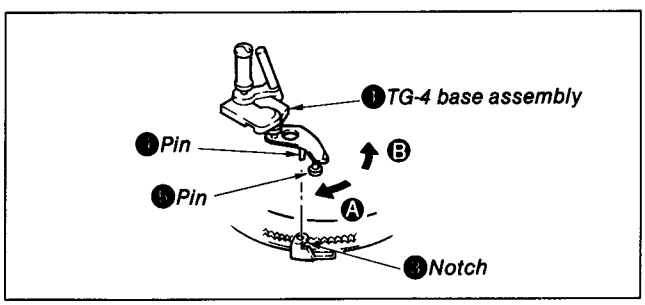


Fig. 8-25

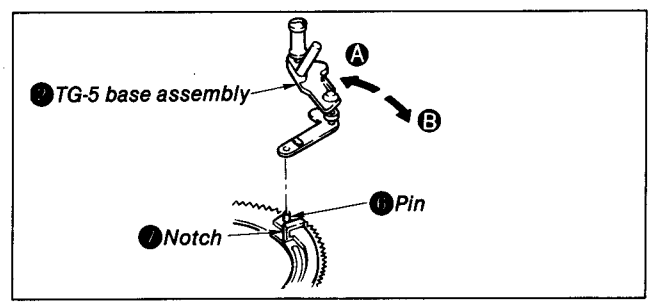


Fig. 8-26.

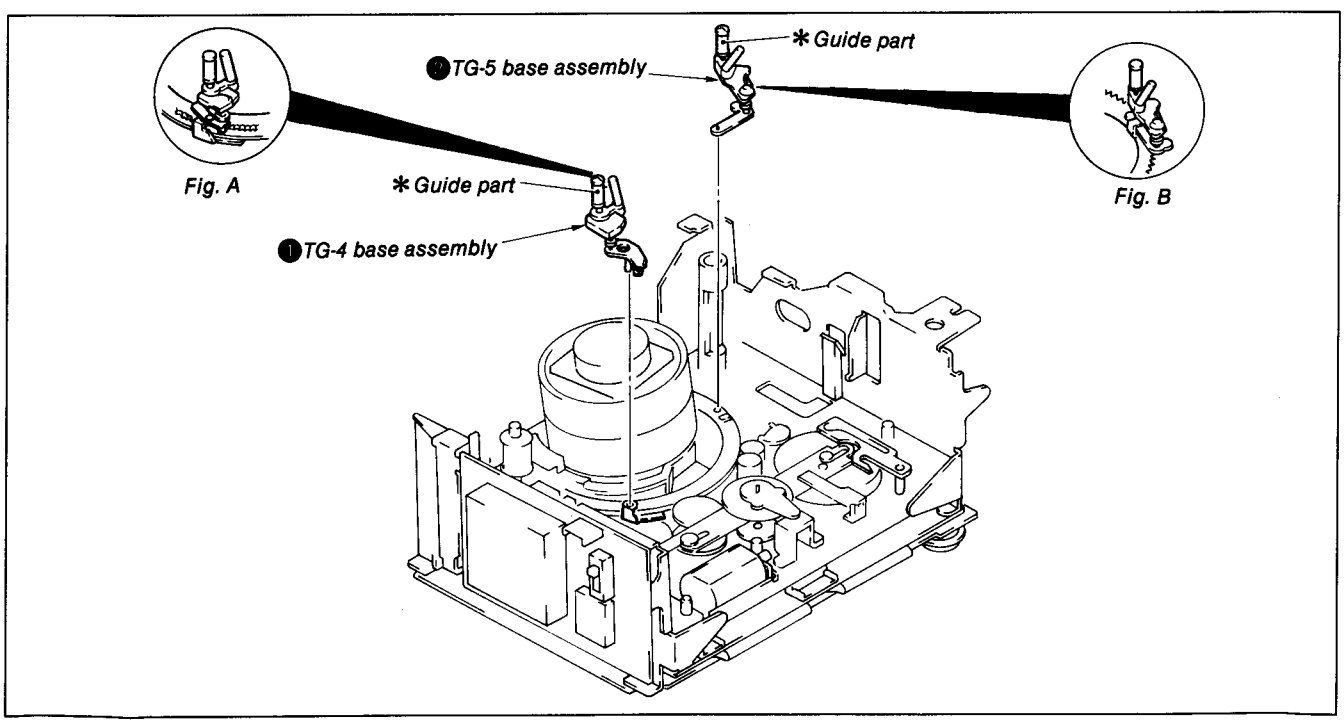


Fig. 8-27.

8-3-15. Loading Slider T Assembly (See Fig. 8-28)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) By referring to 8-3-14, remove TG-4 base assembly and TG-5 base assembly.
4) By referring to 8-3-25, remove drum unit.
5) Remove screw ❶, and remove plate spring T ❷ and T slider stopper ❸.
6) Remove screw ❶ and remove slider supporter ❺.
7) Remove two lock washers ❻ and remove loading slider T assembly ❼.

2. Installation

1) Apply molten grease to the arrow marked point of plate spring T ❷, as shown in Fig. A.
2) Apply molten grease to the arrow marked point of loading slider T assembly ❼, as shown in Fig. B.
3) Install loading slider T assembly ❼ by matching hole ❽ of the loading slider T assembly to hole ❾ of the loading slider S assembly.
4) Install two locking washers ❻.
5) Install slider supporter ❺ with screw ❶.
6) Install T slider stopper ❸ and plate spring ❷ with screw ❶.
7) By referring to 8-3-14, install drum unit.
8) By referring to 8-3-14, install TG-4 base assembly and TG-5 base assembly.
9) By referring to 8-3-10, install LS chassis assembly.
10) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

Notes:

1) Be sure to confirm that lock washer ❷ has been engaged completely into the groove of the shaft.
2) By referring to 8-3-17, perform phase adjustment after loading slider T assembly ❼ is installed.

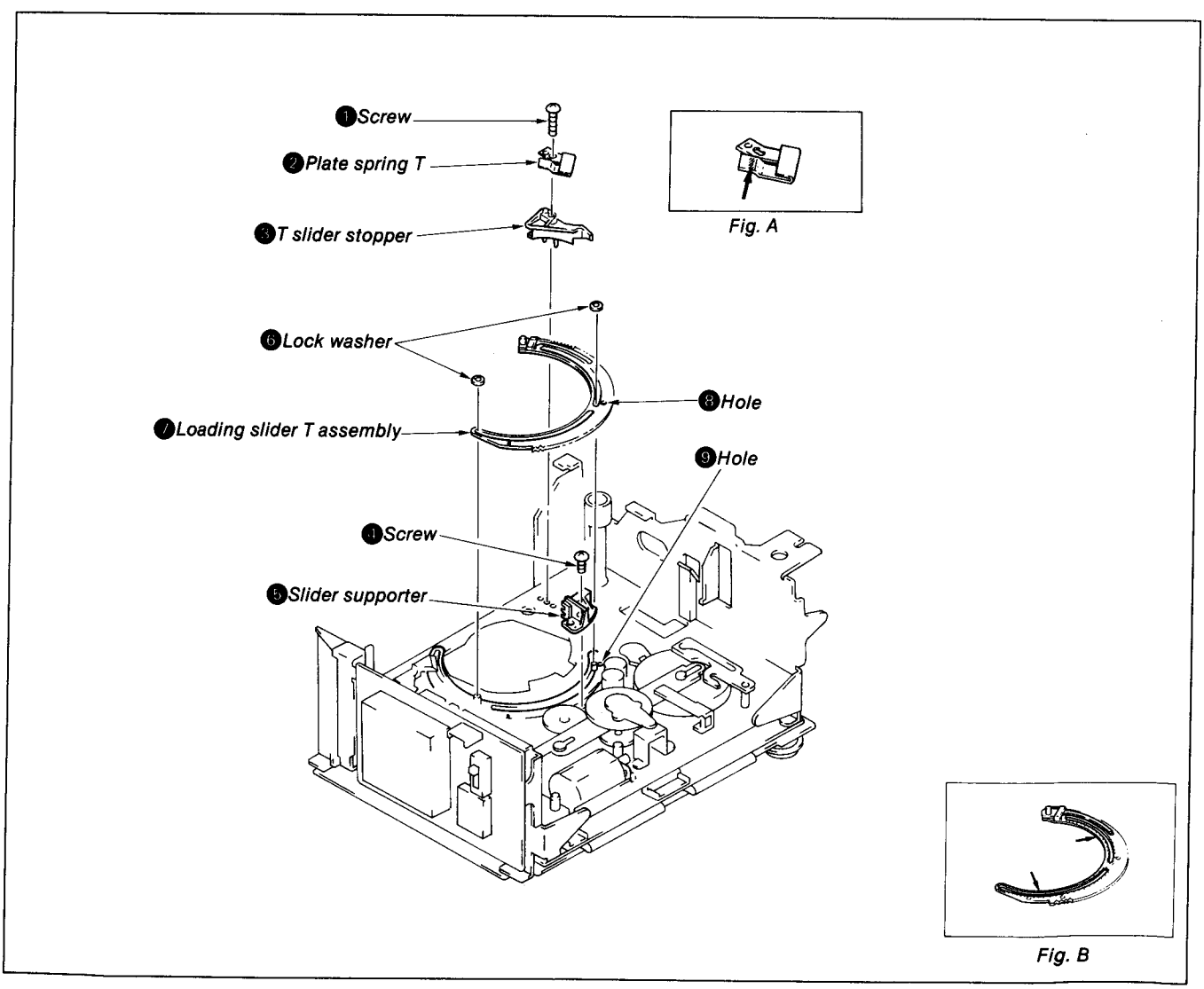


Fig. 8-28.

8-3-16. Loading Slider S Assembly (See Fig. 8-29)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) By referring to 8-3-14, remove TG-4 base assembly and TG-5 base assembly.
4) By referring to 8-3-25, remove drum unit.
5) By referring to 8-3-15, remove loading slider T assembly.
6) Remove screw ❶ and remove S slider stopper ❷.
7) Remove two guide rollers ❸ and remove loading slider S assembly ❹.

2. Installation

1) Apply a little molten grease to the arrow marked two point of shaft ❺, as shown in Fig. A.
2) Apply molten grease to the arrow marked point of loading slider S assembly ❹, as shown in Fig. B.
3) Install loading slider S assembly ❹ by matching hole ❻ of loading slider S assembly to hole ❼ of the mechanical chassis.
4) Install two guide rollers ❸.
5) Install S slider stopper ❷ with screw ❶.
6) By referring to 8-3-15, install loading slider T assembly.
7) By referring to 8-3-25, install drum unit.
8) By referring to 8-3-14, install TG-4 base assembly and TG-5 base assembly.
9) By referring to 8-3-10, install cassette arm assembly and LS cassette compartment assembly.
10) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

Note:

By referring to 8-3-17, perform phase adjustment after loading slider T assembly has been installed.

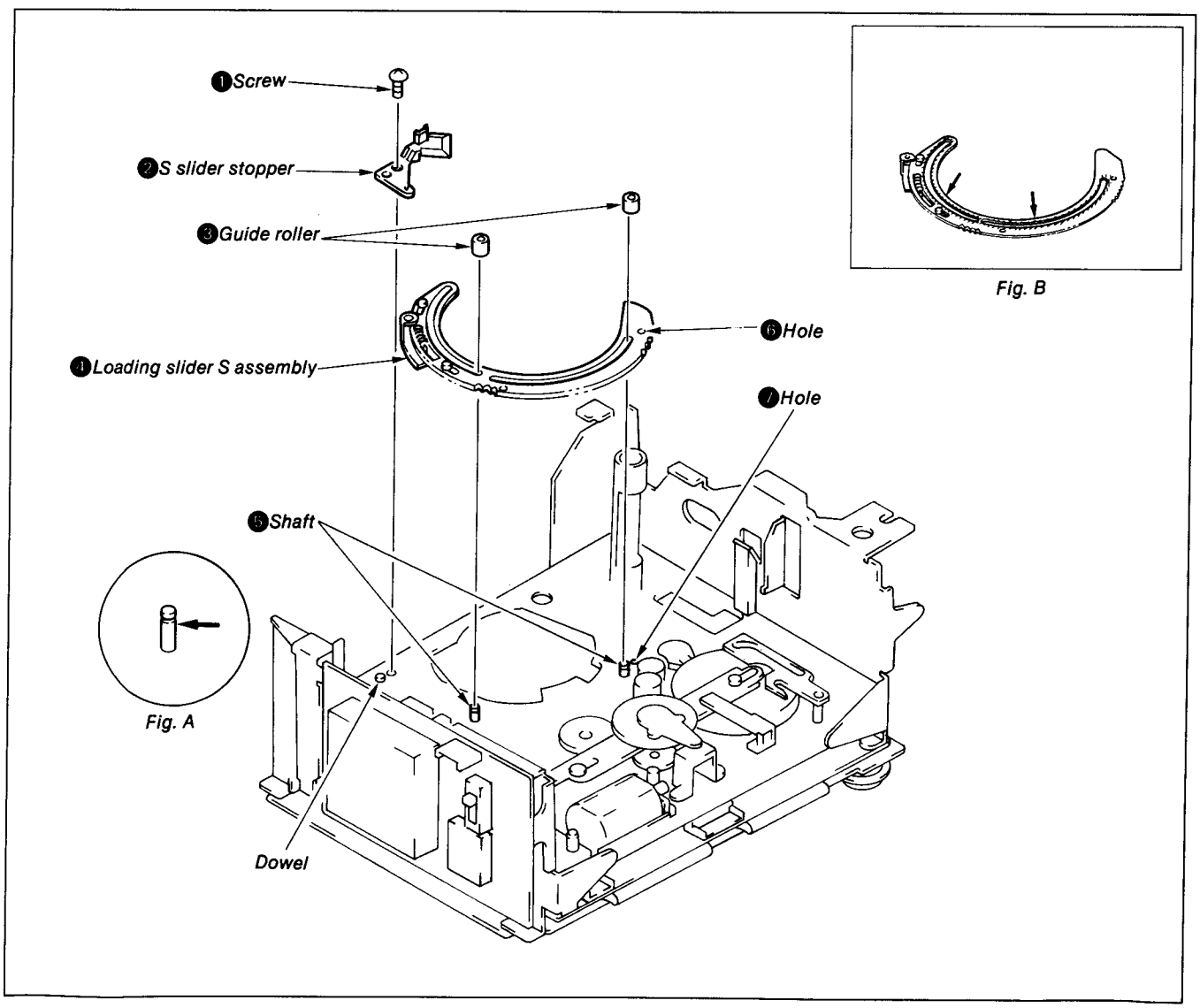


Fig. 8-29.

8-3-17. Phase Adjustment (See Fig. 8-30)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis.
3) By referring to 8-3-14, remove TG-4 base assembly and TG-5 base assembly.
4) By referring to 8-3-25, remove drum unit. (See Fig. 8-30)
5) Remove the stopper washer ❹ and then remove the loading gear S ❻.
6) Remove the stopper washer ❽ and the LS gear A ❼.

2. Adjustment

1) Confirm that it has been turned into BLANK after GUIDE LOAD mode.
2) Adjust the positions of the respective holes of loading slider T assembly ❷, loading slider S assembly ❸, and the mechanical chassis, and then insert a rod ❶ of approximately 1mm in diameter into the holes.
3) Adjust the position of the hole of LS gear C assembly and the position of the hole of the mechanical chassis, and insert rod ❶ of approximately 1mm in diameter into the holes.
4) Adjust by turning loading gear M ❺ so that the notch portion on it comes to the loading gear S ❻ side, as shown in Fig. A.
5) As shown in Fig. B, align the hole of the loading slider T assembly ❷ with that of the LS gear A ❼, and mount the LS gear A ❼.
6) Install stopper washer ❽.
7) Remount the loading gear S ❻, and then install, the stopper washer ❹.

Note:

Be sure to confirm that stopper washer ❽ and ❹ are set completely in the groove of the shaft.

3. Installation

1) Similarly to Fig. C, apply grease (one drop equivalent to a grain of rice) to the five positions on the internal grove of the cam assembly ❾.
2) By referring to 8-3-25, install drum unit.
3) By referring to 8-3-14, install TG-4 base assembly and TG-5 base assembly.
4) By referring to 8-3-10, install LS chassis assembly.
5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette assembly.

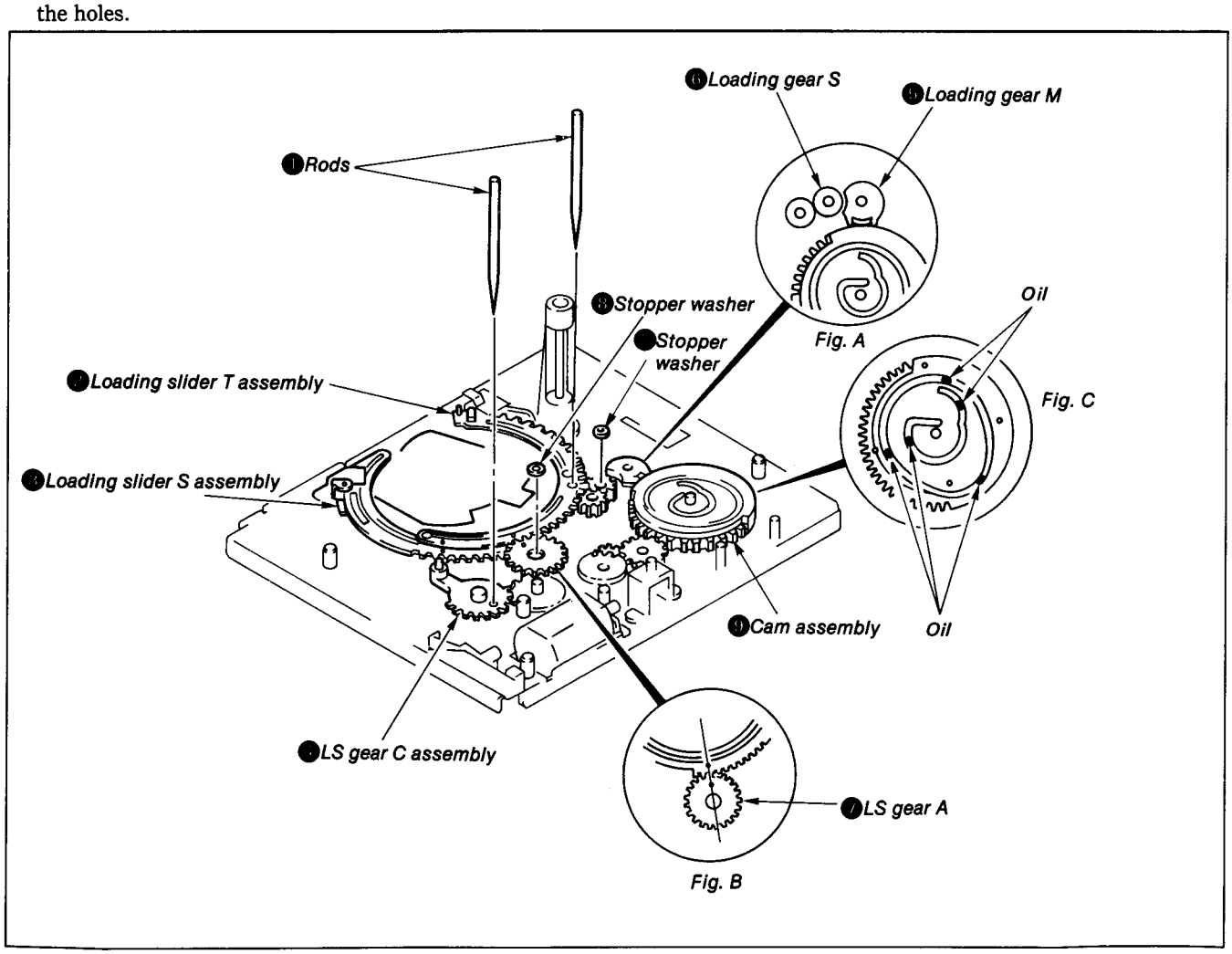


Fig. 8-30.

8-3-18. Gear Train Operation Check (See Fig. 8-31)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) By referring to 8-3-14, remove TG-4 base assembly and TG-5 base assembly.
4) By referring to 8-3-35, remove drum unit.
5) By referring to 8-3-21, remove LM motor assembly.

2. Checking

1) Insert a point of tweezers into the hole of the cam assembly ❶.
2) Rotate the cam assembly ❶ once around in the direction of arrow Ⓐ, and then once around in the direction of arrow Ⓑ. Repeat the above three times.
3) At this point, confirm that the individual gears and sliders shown in Fig. are being operated smoothly, and there are no abnormal loading.

Note:

When making cam assembly ❶ to rotate with the point of tweezers, exercise cautions so as not to cause flaw to the mechanical chassis.

3. Installation

1) By referring to 8-3-21, install LM motor assembly.
2) By referring to 8-3-25, install drum unit.
3) By referring to 8-3-14, install TG-4 base assembly and TG-5 base assembly.
4) By referring to 8-3-10, install LS chassis assembly.
5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

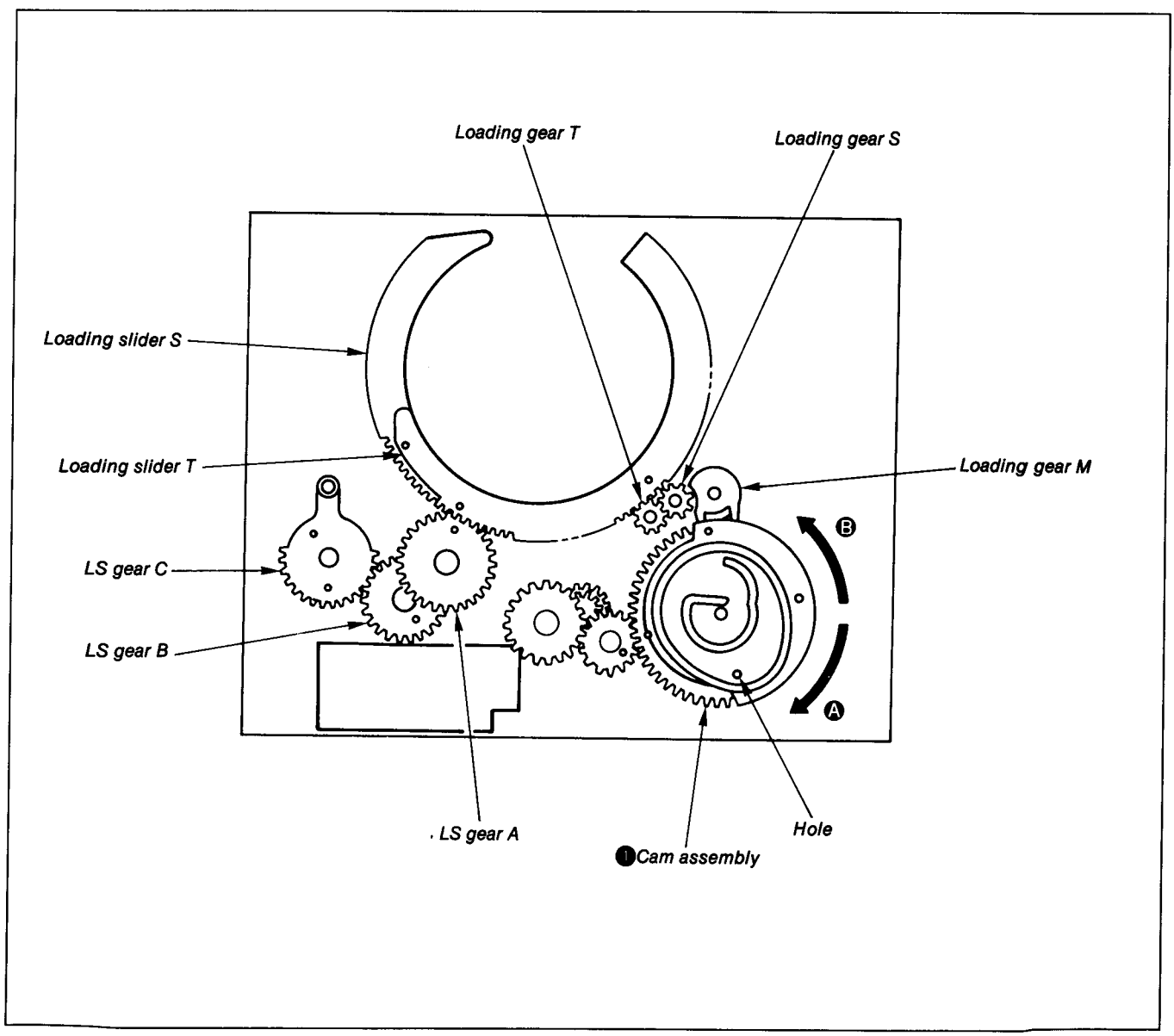


Fig. 8-31.

8-3-19. FP-53 Flexible Board (See Fig. 8-32)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) By referring to 8-3-4, remove T reel table assembly.
4) By referring to 8-3-3, install S reel assembly.
5) Remove two claws ❶ and lift the push switch. Then, peel off the flexible board ❷ stuck to the LS chassis.

Note:

When peeling off FP-53 flexible board ❷, care must be taken so as not to tear it.

2. Installation

1) Clean the joint section of the LS chassis assembly and the FP-53 flexible board ❷ with a cleaning liquid.
2) Peel off the sheet covering of the adhesion tape on the rear side of FP-53 flexible board ❷ and match the shaft hole to shaft ❸ of the LS chassis and claw, and thus the tape is adhered.
3) Adjust dowel ❺ (two positions) and install it with claw ❶, and match hole of FP-53 flexible board ❷ to dowel ❻.
4) By referring to 8-2-3,
5) By referring to 8-3-4, install T reel table assembly.
6) By referring to 8-3-10, install LS chassis assembly.
7) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

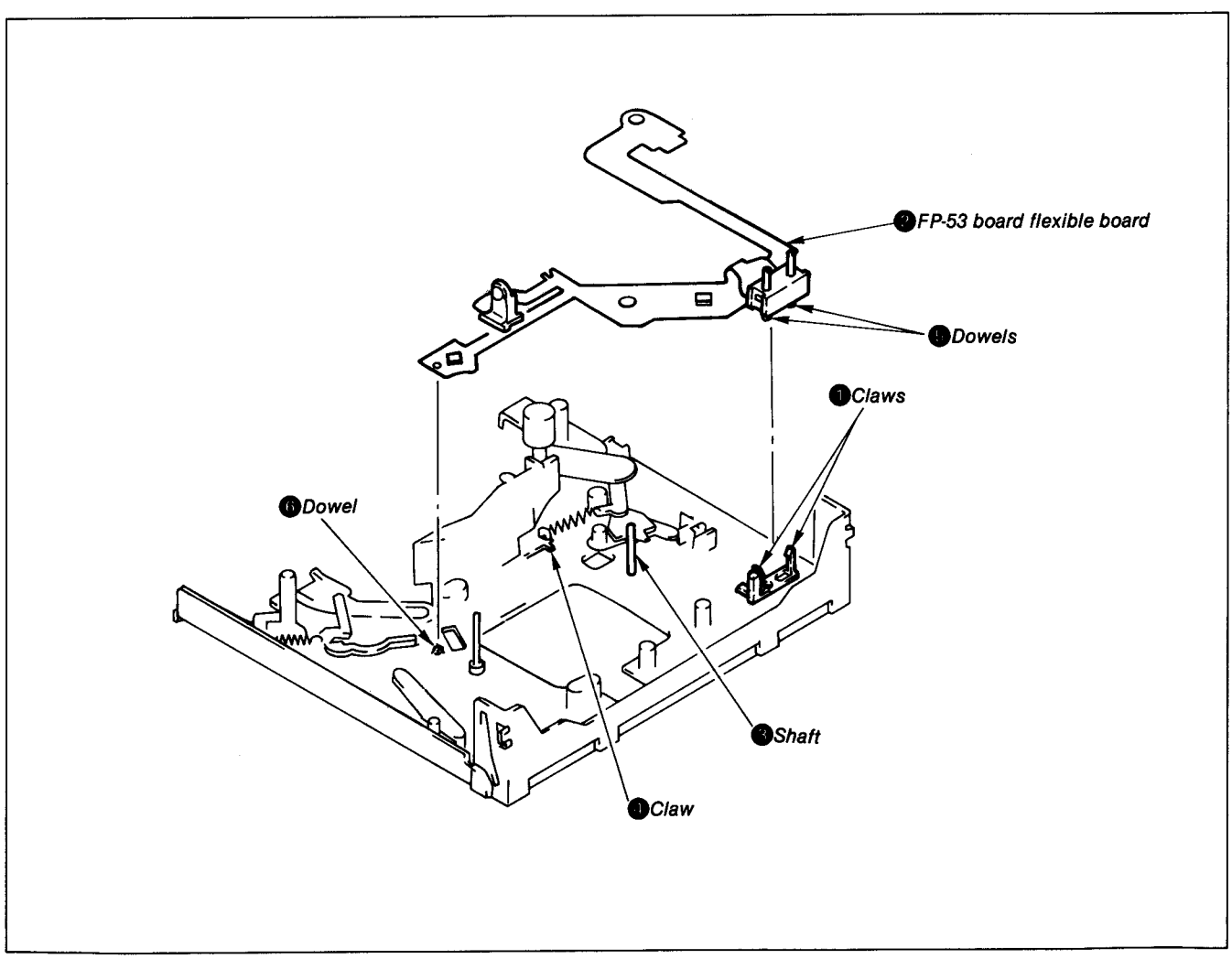


Fig. 8-32.

8-3-20. Cassette Compartment Lock Assembly (See Fig. 8-33)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) Remove screw ❸ and screw ❹, and remove cassette compartment lock assembly ❺.
4) Remove screw ❶ and remove CCD SW ❷.

2. Installation

1) Install CCD SW ❷ with screw ❶.
2) Match cassette compartment lock assembly ❺ to dowel ❻, and install.
3) Install screw ❹ loosely and then tighten screw ❸ and screw ❶ successively in this order.
4) By referring to 8-3-10, install LS chassis assembly.
5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

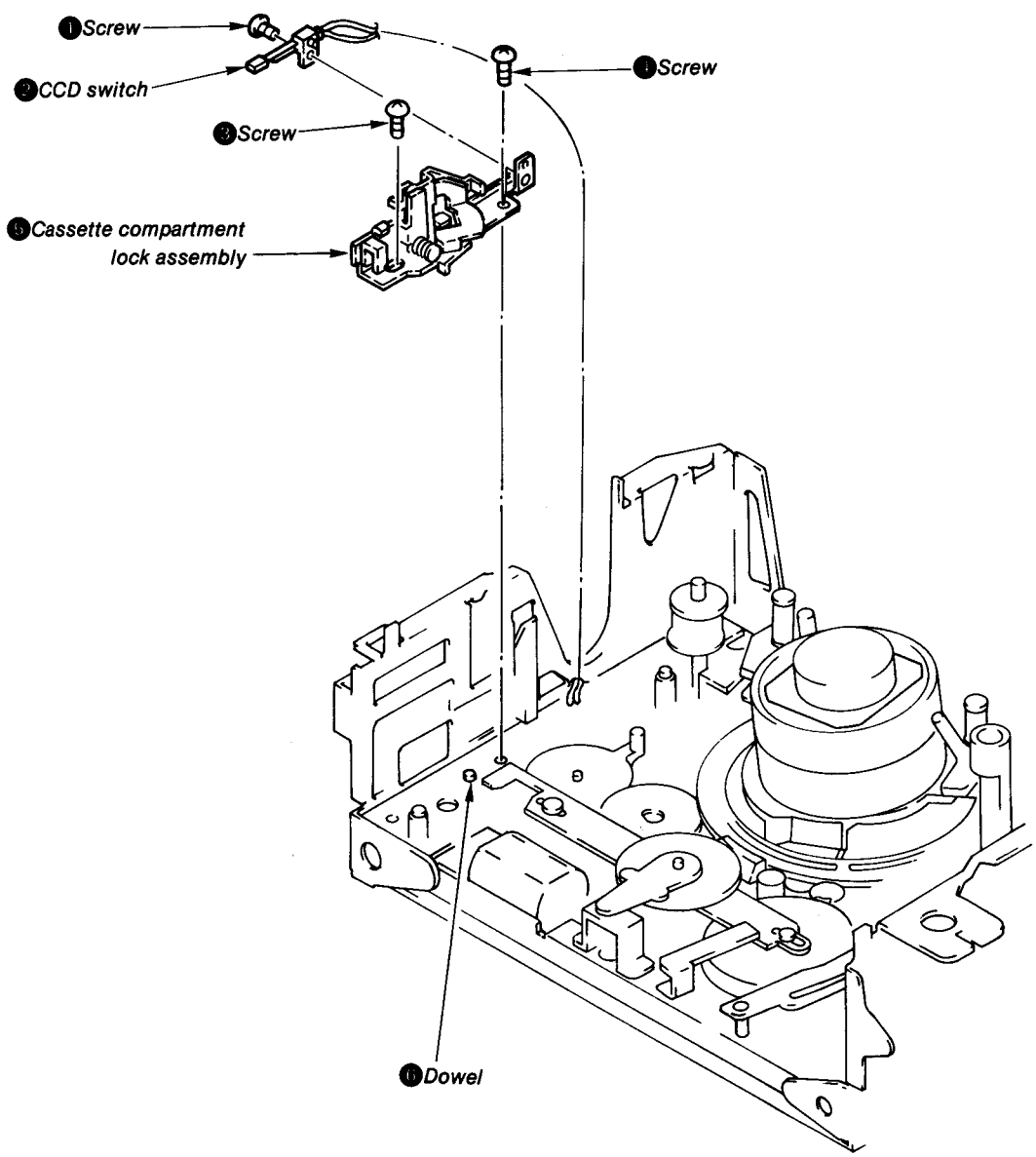


Fig. 8-33.

8-3-21. LM Motor Assembly (See Fig. 8-34)

1. Removal

1) By referring Section 2 DISASSEMBLY, 2-15 Opening the SS-70 board.
2) Remove screws ❶, ❷ and ❸ and remove the LM motor assembly ❹ in the direction of arrow Ⓐ.
3) Remove two screws ❺ and disassemble motor holder assembly ❻ and DC motor ❼.
4) Remove stopper washer ⓭ and remove worm wheel ❽ from shaft ❾.
5) Remove the solder of the two cords ❿ coming out from the DC motor ❼ and remove the DC motor ❼ from the mechanical chassis.

2. Installation

1) Solder the two cords coming out from the DC motor ❼ which is shown in Fig. A, to the two points as shown in Fig.
2) Apply 1/3 drop of oil onto shaft ❾ and install a worm wheel A ❽.
3) Apply a size of one rice grain of grease to worm ❾.
4) Install motor holder assembly ❻ and DC motor ❼.
5) Install motor holder assembly ❻ to pin ⓫ of the mechanical chassis by matching the hole of it.
6) Tighten the screws ❸, ❷ and ❶ in that order.

Note:

- Be sure to perform the soldering at 260°C within 5 seconds.
- Pull out the cord coming from the DC motor ❼ lest it should sag over the chassis.

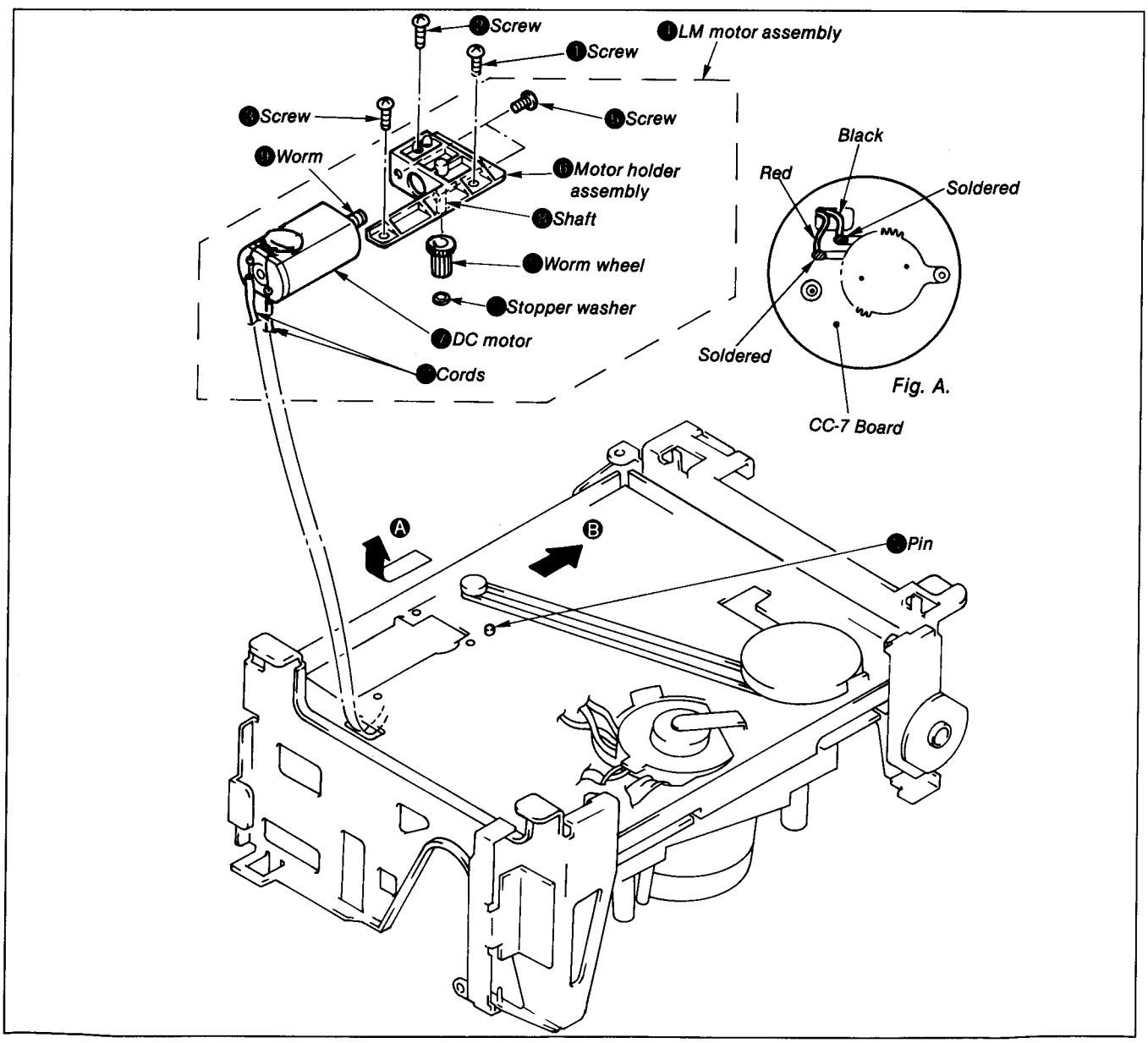


Fig. 8-34.

8-3-22. Capstan Motor Assembly (See Fig. 8-35)

1. Removal

1) Remove screws ❶ and ❷, and remove capstan motor assembly ❺.
2) Remove stopper washer ❻ and conversion gear assembly ❼, and remove relay belt ❸.

Note:

Do not touch the capstan motor shaft marked with * oil seal marked with * and rotor marked with *.

2. Installation

1) As shown in Fig. A. apply over 1/3 drop and below 1/2 drop of oil to the arrow marked point of shaft ❽.
2) Install conversion gear assembly ❼ to shaft ❽ while applying relay belt ❸ to the assembly.
3) Install stopper washer ❻.
4) Install capstan motor assembly ❺ to mechanical chassis while applying relay belt ❸ to pulley ❹.
5) Be sure to confirm that the capstan motor and mechanical chassis become horizontal, and install them with screws ❶ and ❷ successively in that order.

Notes:

1) Be sure to confirm that stopper washer ❻ is being set completely into the groove of shaft ❽.
2) Care should be taken so as not to leave the relay belt ❸ in the stretched state.

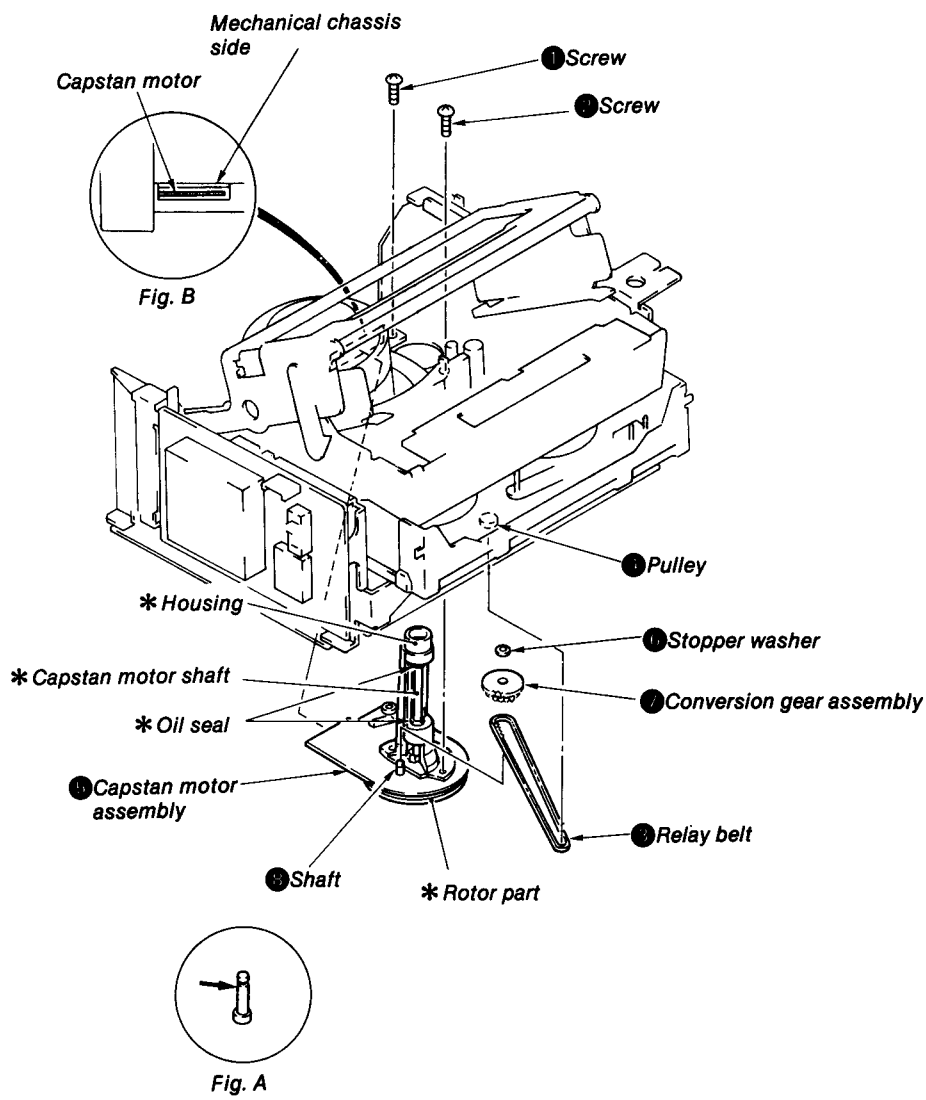


Fig. 8-35.

8-3-23. TG-2 (See Fig. 8-36)

1. Removal

1) Remove TG-2 nut ❶.
2) Remove upper flange receptacle ❷. TG-2 flange ❸. TG-2 roller ❹. TG-2 sleeve ❺. TG-2 flange ❻. TG-2 lower flange receptacle ❼ and pressure coil spring ❽.

Notes:

1) When removing TG-2 nut ❶, taken precautions not to scatter the parts which are being pressed by the pressure coil spring ❽.
2) Be sure to use gloves when installing and removing TG-2 flange ❸ and TG-2 roller ❹.

2. Installation

1) Install pressure coil spring ❽. Upper flange receptacle ❼, TG-2 lower flange ❻. TG-2 sleeve ❺. TG-2 roller ❹. TG-2 flange ❸ and upper flange receptacle ❷.
2) Install TG-2 nut ❶.
3) Perform TG-2 height preset.

3. TG-2 height preset

1) Push up upper flange receptacle ❾ in the direction of arrow as shown in Fig. A.
2) Screw TG-2 nut ❶ into TG-2 shaft ● until slit part heigh becomes the same level of the upper surface of TG-2 shaft ●.
3) Rotate TG-2 nut ❶ 1/2 times in the direction of arrow as shown in Fig. B.

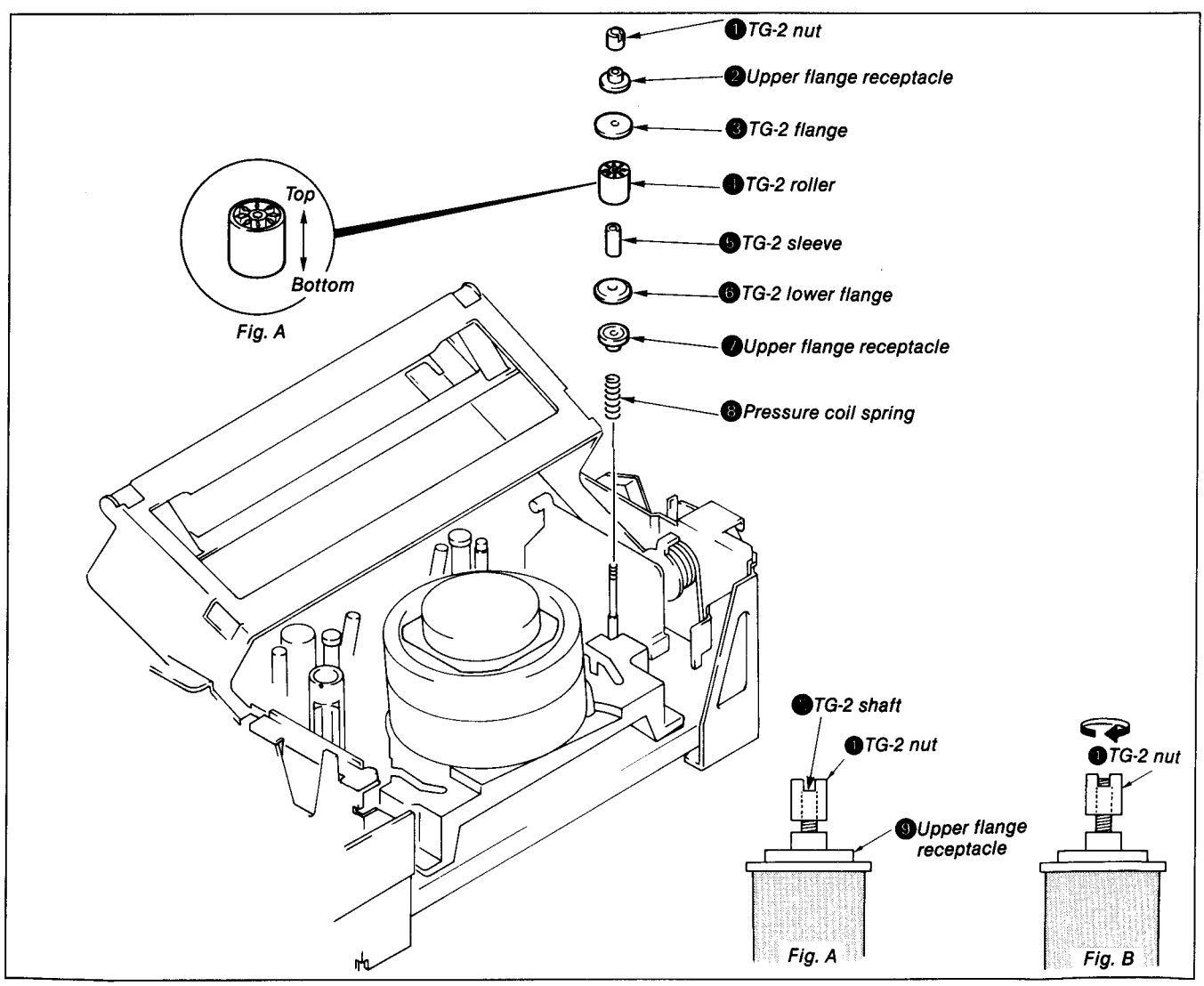


Fig. 8-36.

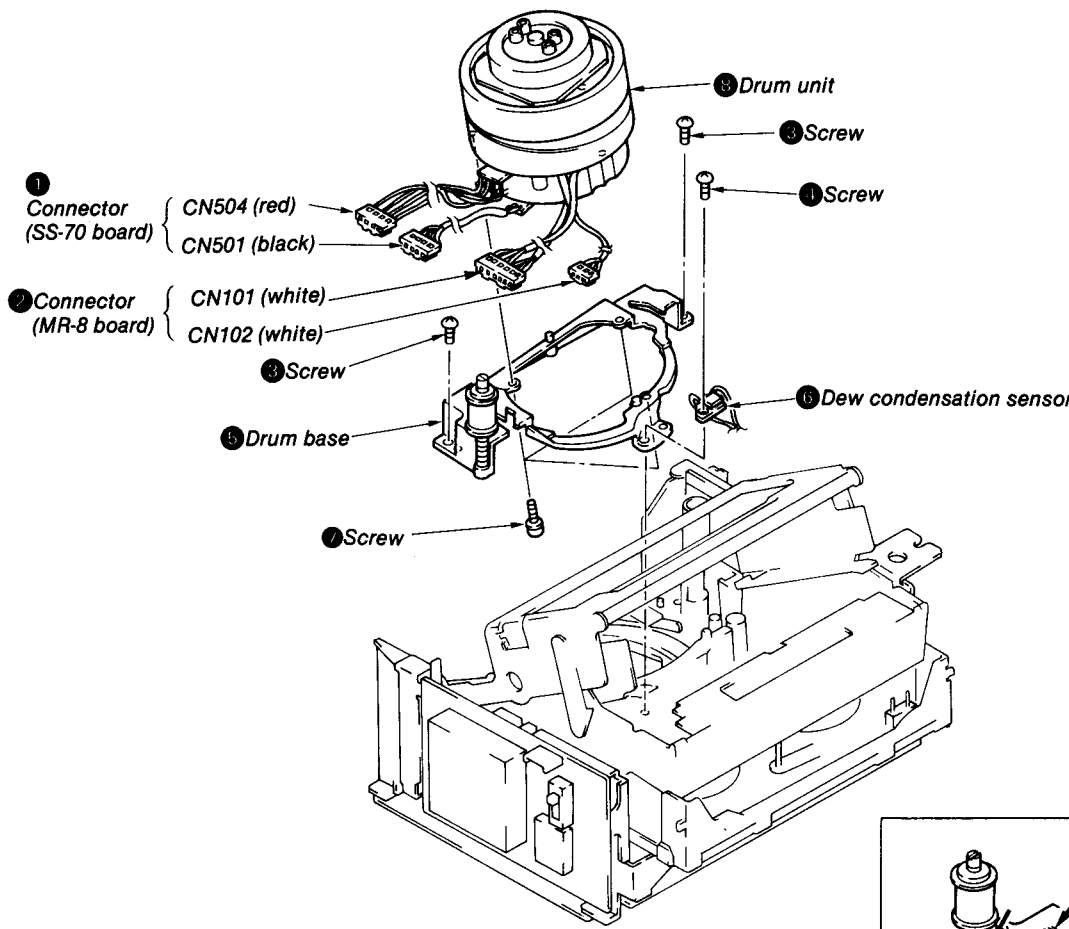
8-3-24. Drum Unit (See Fig. 8-37)

1. Removal

1) Turn into [EJECT] mode.
2) By referring, Section 2 DISASSEMBLY, 8-15 open SS-70 board and remove two connectors ❶.
   connectors ❶.
3) Remove two connectors ❷ from MR-8 board.
4) Remove two screws ❸ and a screw ❹, and remove drum base ❺ and dew condensation sensor ❻.
5) Remove three screws ❻ and three washers ❼, and remove drum unit ❽.

2. Installation

1) Install drum unit ❽ to drum base ❺ and set three screws ❻.
2) Mount drum base ❺ on the mechanical chassis and secure it with two screws ❸.
3) Tighten dew condensation sensor ❻ and drum base ❺ with screw ❹.
   Note:
   Be sure not to use screws ❸ and ❹ again after they have once been loosened.
4) Apply molten grease to the arrow marked point, as shown in Fig. A.
5) Install two connectors ❶ to SS-70 board.
6) Install two connector ❷ to MR-8 board.
7) By referring, Section 2 DISASSEMBLY, 2-15, install SS-70 board.
8) Perform tape path adjustment in item 8-4.



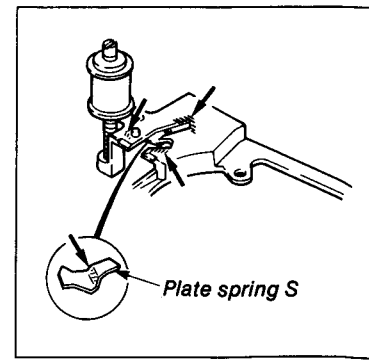


Fig. A

Fig. 8-37.

8-3-25. Replacement of Rotary Upper Drum

1. Removal

- If video recording is possible, make video recording prior to the removal.

1) Remove two hexagonal socket head cap screws ❺ and damper ❷.
2) Remove all the six points of soldering in ⓐ section, and confirm that the board and pins which are projected from the lower side of the board can be moved freely by touching with tweezers, etc.
3) Remove two hexagonal socket head cap screws ❶. (See Fig. 8-39)
4) Install jig ❻ (Ref No. J-10) with the attached two screws ❶ into the screw hole where the damper ❷ had been installed and twist the attached hexagonal socket head cap screw ❺ into jig ❻. By doing so, the rotary drum becomes floated to the top side and this acts to remove the rotary upper drum ❼. (See Fig. 8-38.)

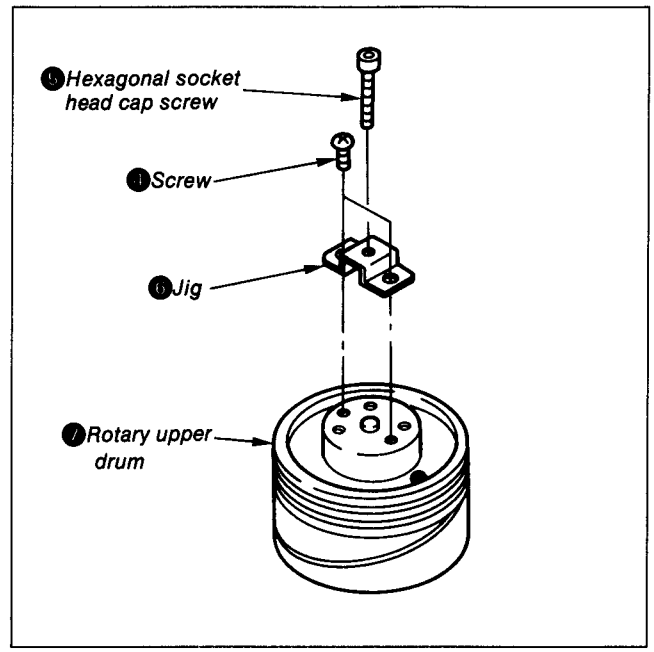


Fig. 8-38.

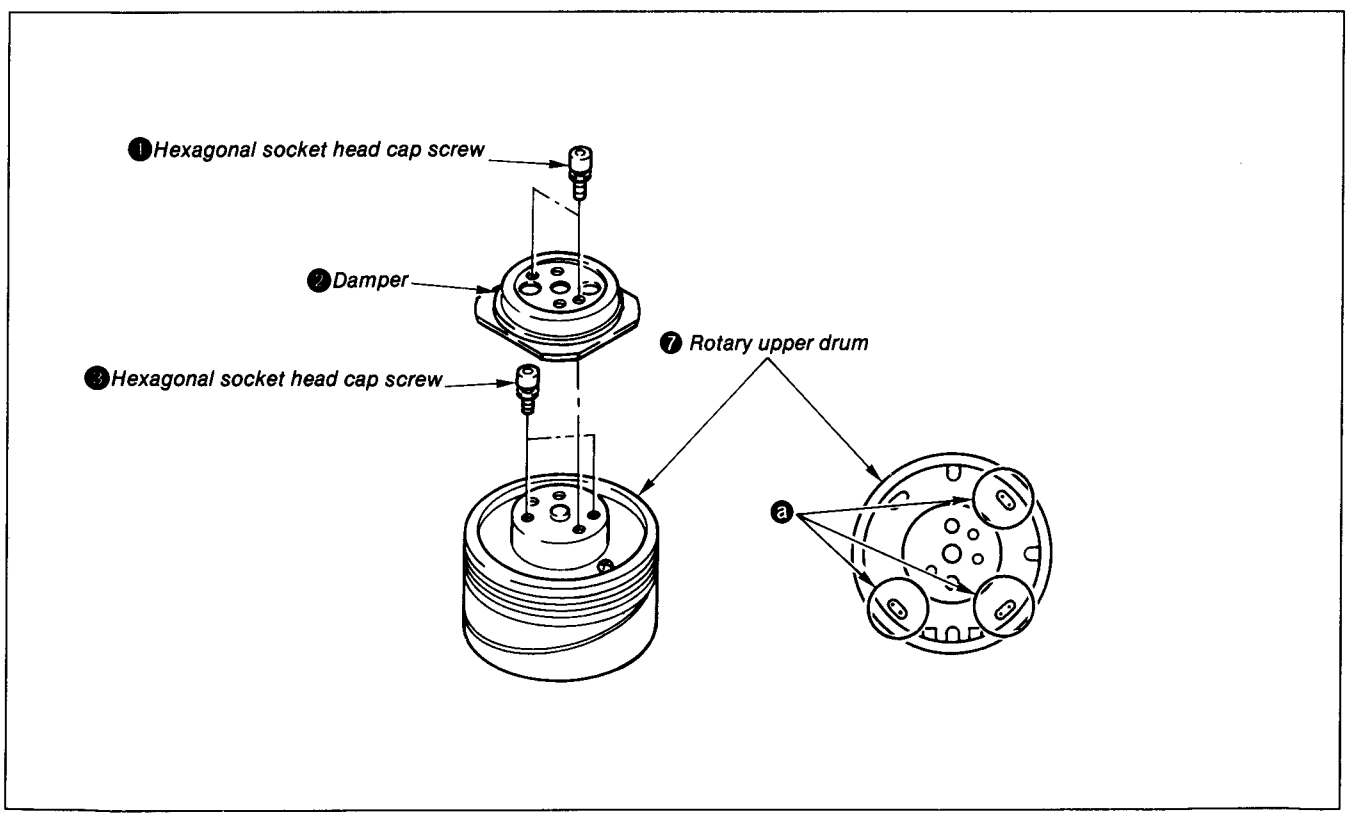


Fig. 8-39.

2. Installation

1) Perform cleaning of flange surface and rotary upper drum ❼ surface which are contacted to it, and confirm that there are no dust and flaws.
2) Insert jig ❶ (Ref No. J-10) of the rotary upper drum ❼ into the position determining hole and set it lightly to the rotary upper drum.

Note:

At this point, be sure to confirm that pin ❽ appears from the hole of the board on which the rotary upper drum is mounted. (Fig. 8-40).

3) Remove jig ❶ from upper rotary drum ❼ and push it gently into lower one manualy. However, when it cannot be inserted thoroughly, tighten two hexagonal socket head cap screws ❸ alternately to secure it temporarily.
4) Insert jig ❶ again into position determining hole ❺, and be sure to confirm that it can be inserted smoothly.
   When it cannot be inserted, loosen two hexagonal socket head cap screws ❸, and by referring to Removal 3), set it again.
5) Tighten two hexagonal socket head cap screws ❸.
6) Solder pin ❽ of a section.

Note:

At this point, be sure not to let the soldering flow underneath the board.

7) Install damper ❹ with two hexagonal socket head cap screws ❶.

Notes:

1) Be sure not to tighten too strongly.
2) When performing installation, special care should be taken so as not to mistake the hexagonal socket head cap screws ❸ (2 × 5) with that of ❶ (2 × 2.7).
3) Be sure to perform 8-4 tape path adjustment after installation.

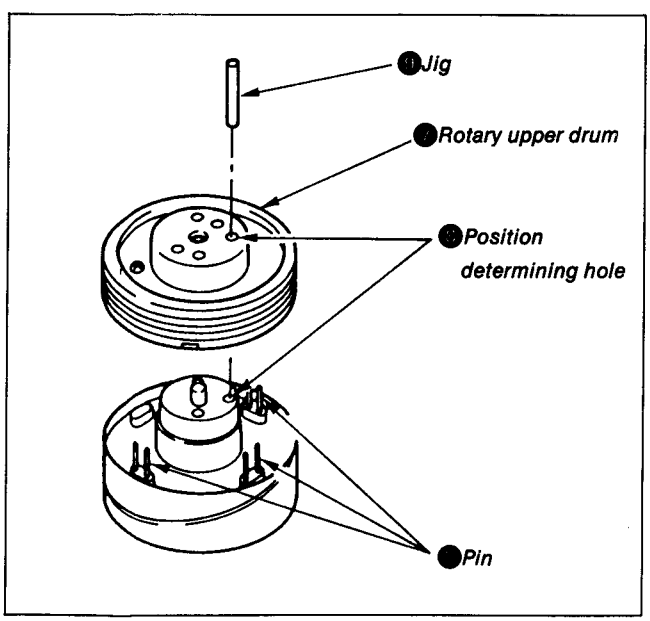


Fig. 8-40.

8-3-26. Reel Table Height Check (See Fig. 8-41)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever.
3) By referring to 8-3-2, remove pendulum stopper plate.

2. Checking

1) Confirm by using calipers, etc., so that the heights from LS chassis ❶ to S reel table reel receptacle plate surface ❷ and from LS chassis to T reel table reel receptacle plate surface ❸ should respectively be 6.85 ± 0.15mm.

3. Installation

1) By referring to 8-3-2, install pendulum stopper plate.
2) By referring to 8-3-1, install reel lock lever assembly.
3) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

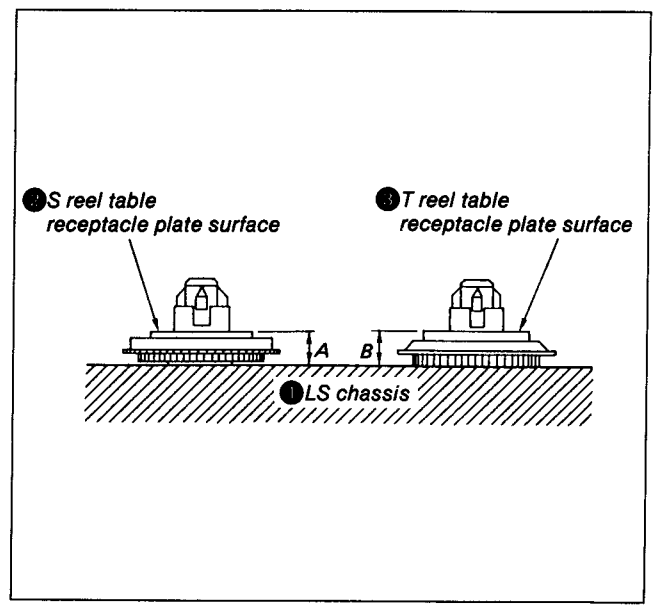


Fig. 8-41.

8-3-27. FWD/RVS Torque Check

1) Set the FWD and RVS take up torque cassette (Ref. No. J-9).
2) Turn into [FWD] mode, and confirm torque value at the T reel side becomes 11 gcm to 19 gcm.
3) Turn into [REC REVIEW] mode, and confirm torque value at the S reel side becomes 20 gcm to 32 gcm.
4) In the event the above-mentioned value are not indicated, be sure to replace the individual reel tables.

8-3-28. Tension Regulator Position Adjustment

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.

2. Adjustment

1) Turn into [REC] mode and set a cassette tape and run the tape. (See Fig. 8-1-4)
2) In tape running state, confirm whether the arrow marked Ⓐ point is positioned at the point (arrow mark Ⓑ) 1/3 within the thickness of LS guide ❷ or not. (See Fig. 8-42)
3) When it is not at the specified position, remove the cassette and perform the adjustments described in after step 4).
4) Loosen screw ❸.
5) If TG-1 arm assembly ❶ is within the inner side than the specified position, shift the tension regulating band plate ❶ slightly in the direction of arrow Ⓒ. If it is in the outer side, shift it slightly in the direction of arrow Ⓓ and secure it with screw ❸. (See Fig. 8-43)

Notes:

Use a cassette tape which has been forwarded to about the middle section.

3. Installation

By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

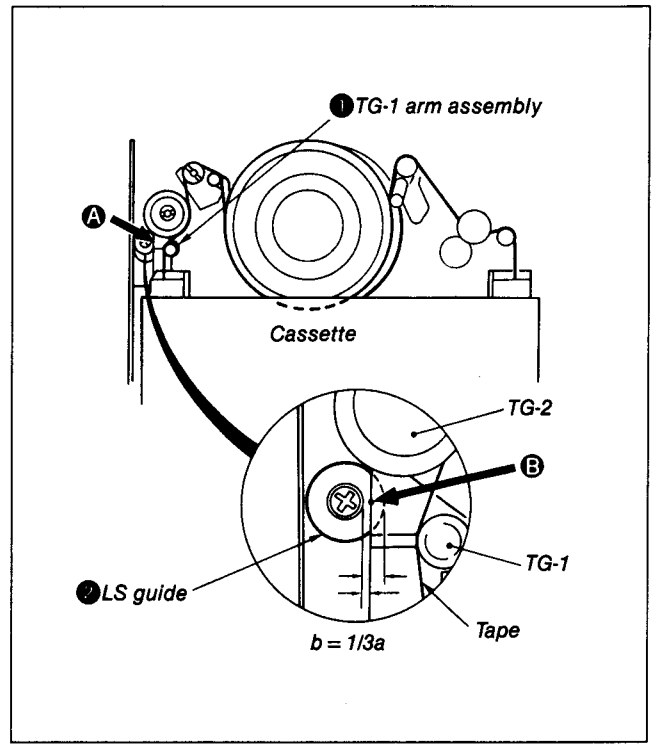


Fig. 8-42.

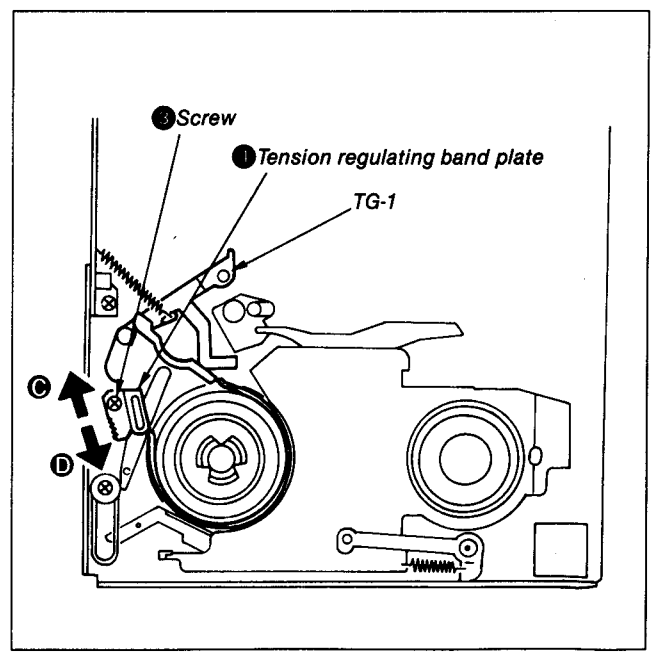


Fig. 8-43.

8-3-29. FWD Back Tension Adjustment

1. Removal

By referring to 8-1-1 and 8-1-2, remove cassette arm assembly.

2. Adjustment

1) Turn into [REC] mode.
2) Set the tension measuring exclusive reel (Ref. No. J-7) ❶.
3) Measure tape tension of the outgoing side by using dial tension gauge (Ref. No. J-6) ❷. At this point, the measurement should be conducted by pulling the tape at the speed of 14mm/sec. (See Fig. 8-44)
4) Move spring hooking position ❶ of tension regulating spring ❸ so that the tension applied becomes within the range of 6.9 to 7.9g. (See Fig. 8-45)

3. Installation

1) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

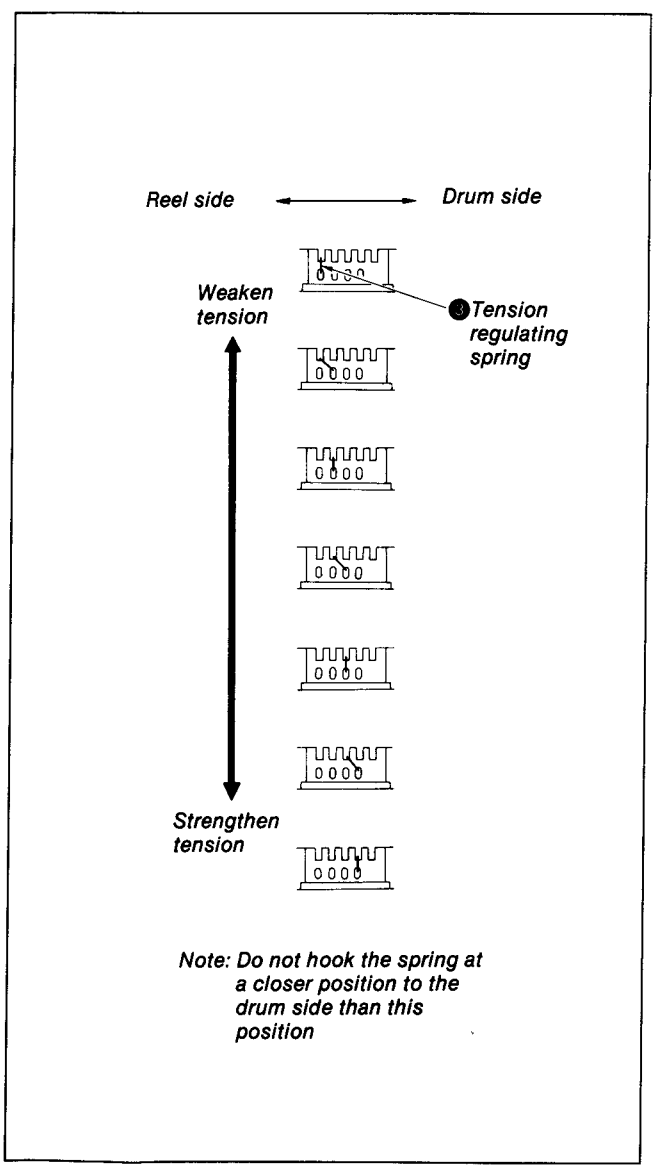


Fig. 8-44.

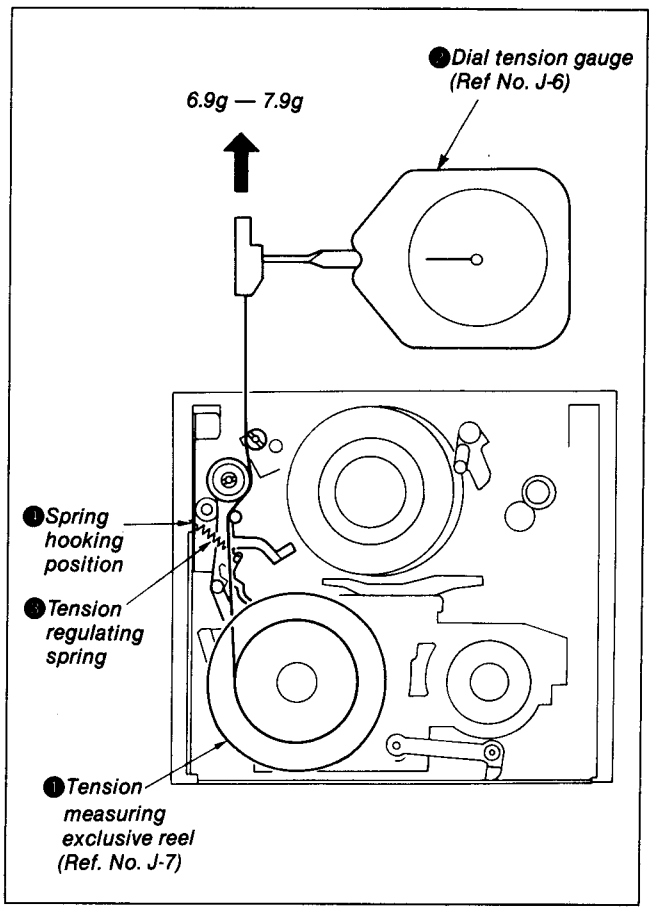


Fig. 8-45.

8-3-30. AF LIMIT SW (See Fig. 8-46)

1. Removal

1) Remove the screw ❶ and remove leaf SW ❷.
2) Take off the solder on leaf SW ❷ and remove two codes.

2. Installation

1) Solder two codes on leaf SW ❷ as shown in Fig. A. Note 1
2) Perform adjustment.

Note 1.

When soldering codes, take care of colour of the codes.

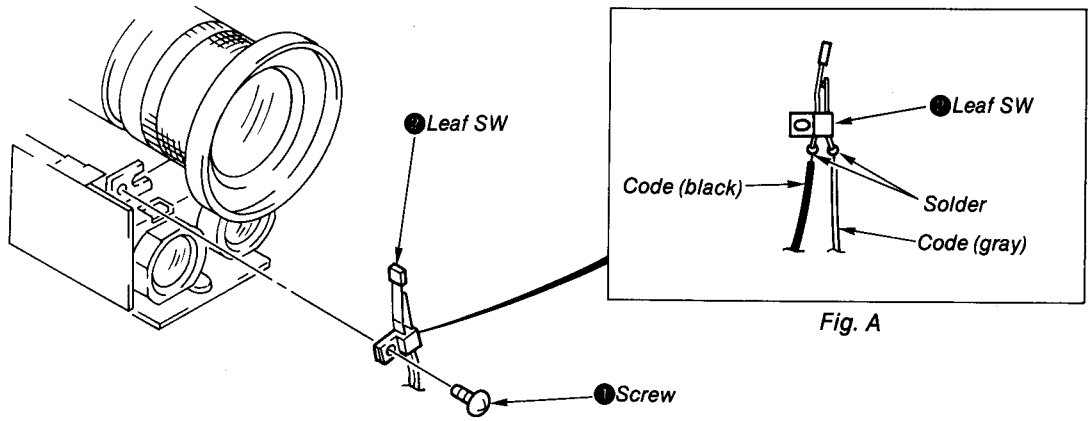


Fig. A

Fig. 8-46.

3. Adjustment

1) Loosen screws ❶, ❸.
2) When AF ring ❺ is in Ⓒ position shown in Fig. B, adjust leaf SW ❷ and leaf SW installing plate ❹ so that leaf SW ❷ is OFF. Note 2.
3) Tighten screws ❶, ❸ and lock the screws.

Note 2.

- Check that there is enough slit between separator and AF ring when leaf SW ❷ is ON, and that leaf SW ❷ is fully off when it is OFF.
- When adjusting leaf SW ❷, move it in the direction of arrow Ⓓ as much as possible and install it.
- When adjusting leaf SW ❷ installing plate ❹, do it within the range of Ⓔ.

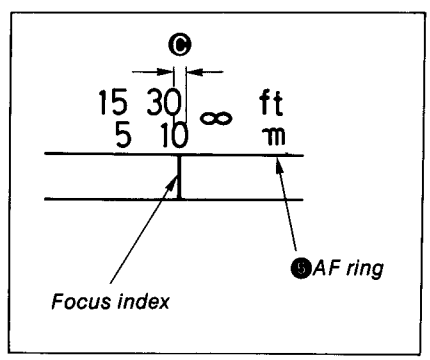


Fig. B

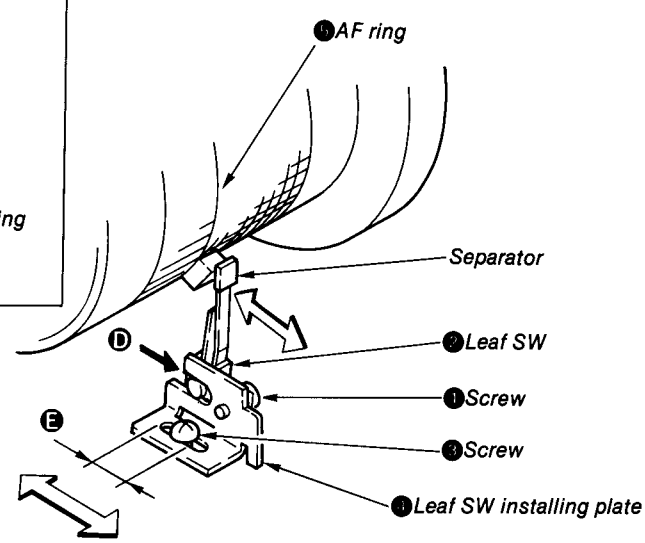


Fig. 8-47.

8-3-31. FOCUS MOTOR (See Fig. 8-48)

1. Removal

1) By referring to Section 2 REMOVAL 2-17, open VC-20 board.
2) By referring to Section 2 REMOVAL 2-18, remove CN861 (white) of VC-22 board.
3) Remove screws ❶, ❷ and remove focus motor ❸. Note 1.
4) Take off solder on focus motor ❸ and remove codes.

Note 1.

You can also perform changing by replacing connector of AF-29 board.

2. Installation

1) Solder two codes on focus motor ❸. Note 2.
2) Install focus motor ❸ and tighten screws ❶, ❷.
3) By referring to "Section 2 REMOVAL 2-18", install CN861 (white) of VC-22 board.
4) By referring to "Section 2 REMOVAL 2-17" install VC-20 board.

Note 2.

When soldering codes, take care of colour of the codes.

3. Adjustment (See Fig. 8-49)

1) Loosen screw ❶ and adjust — dent of adjusting cam to the position shown in Fig. A.
2) Loosen screw ❶.

Note:

Check that the gearing of focus gear and limitter gear is normal after adjustment. If abnormal, adjust by turning — dent of adjusting cam.

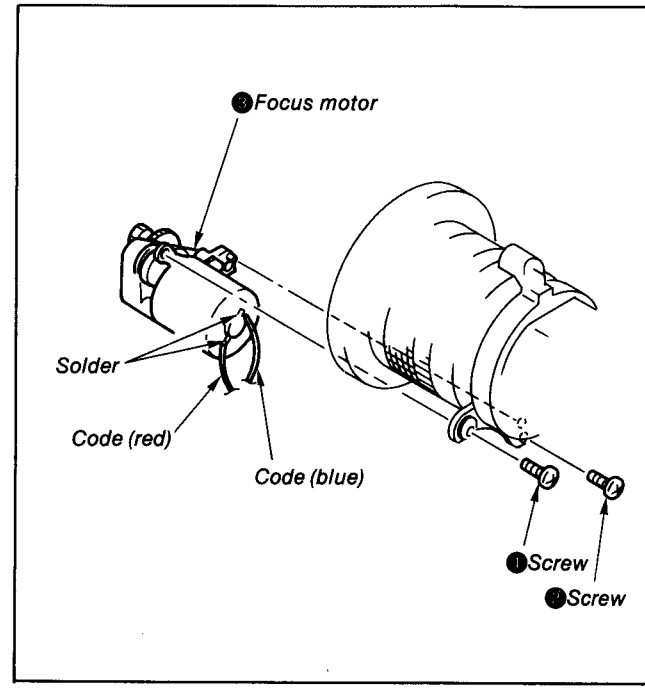


Fig. 8-48.

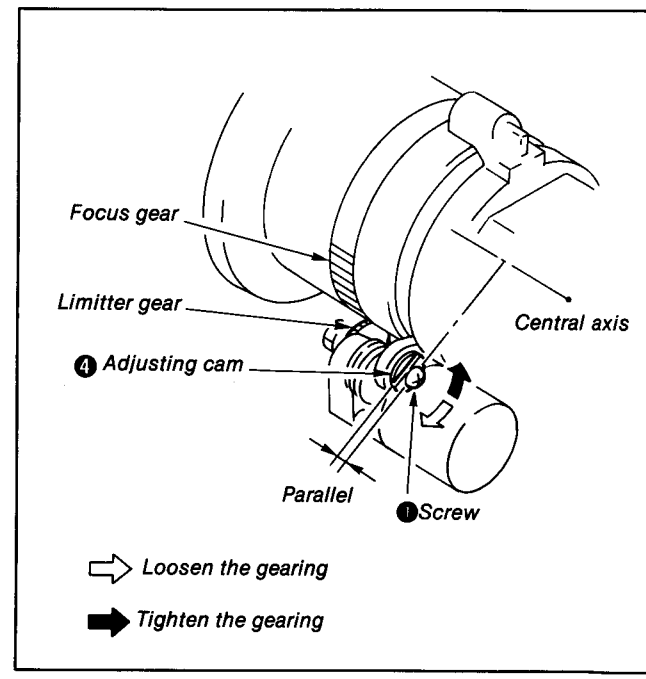


Fig. 8-49.

8-4. TAPE PATH ADJUSTMENT

- Perform this adjustment after comfirming that the electrical adjustment has been completed.

REGARDING TRACK SHIFT & MONITOR JIG

The video 8 system employs a high precision tracking ATF (automatic track finding) and instantaneously controls the tape running speed with the four kinds pilot signals. In this way, the tracking adjustment knob becomes unnecessary, and accurate tracing has become possible.
However, on the other hand, there has been difficulty in adjusting the tape path system with the ATF method. It was due to the fact that complete adjustment had been impossible to be performed because even when the tracing of the head had been a slightly off course, the ATF would perform correction automatically.
Because of this, adjustment is carried out to the tape path system by using the track shift & monitor jig (Ref. No J-6080-843-A). As the track shift and monitor jig forcibly releases the ATF and sets the tracking amount (track shift) manually, the adjustment of the tape path system can easily be carried out.

- Perform this adjustment after the Section 7, camera adjustments and Section 9, video adjustments have been completed.

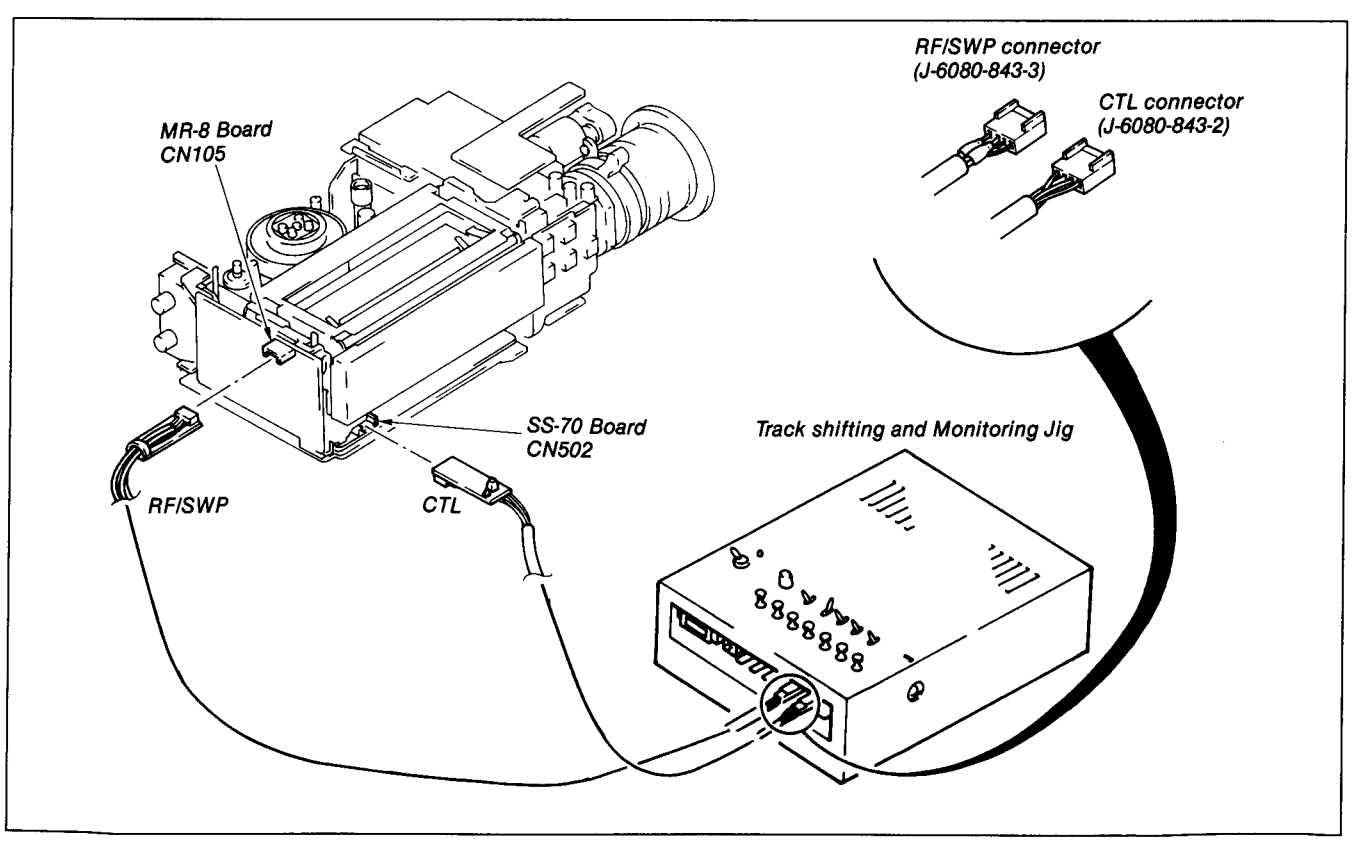


Fig. 8-50.

8-4-1. TRACK SHIFTING AND MONITORING JIG CONNECTING PROCEDURE

1) Supply power to Power Supply Connector (PS IN) as follows :
   SYSTEM CONN: Connect the AC-V8E/UB on that has been modified by paragraph 4) Modifying Procedure.
   AC ADP: Connect an AC adapter AC-M100E/AC-M110E/AC-M100UB for Beta movie.
   REG: Connect a commercially available 12V 3A regulated DC power supply on.
   Connect Blue Clip to its (+) positive end and Black Clip to its (−) negative end (GND), and operate it at about 8V. (Extention code: JIG No. 18)

Note:
Priorities have been assigned to the three above connectors, where SYSTEM CONN carries the highest priority and REG the lowest.
Accordingly, even where they have been connected on together, power will be supplied to SYSTEM CONN.

2) Connection of the connector (See Fig. 8-50)
RF/SWP ....The connector which picks up the RF signals of the RF SW PULSE and CH1 and CH2 of the drum head, and it connects the RF/SWP and CN105 on the MR-8 board. (Ref No. J17)
CTL .....The connector to supply the SEL and ATF LOCK signals and it connects the CTL and CN502 on the SS-70 board. (Ref No. J17)
Other connectors than the above are not used in this set.

3) Setting of the individual switches
SEL .....Turn the SEL "ON" when performing track shift. When it is turned "OFF", it becomes the control on the set side being connected.
PATTERN ...Set to the EV side.
ATF LOCK ..
Turn it "OFF".
Other switches than the above are not used in this set.

4) AC-V8E/UB (AC Adapter for CCD-V8E) Modifying Procedure
   i) Remove two screws ❶ and two screws ❷, and dismount Upper Housing (See Fig. 8-51)
   ii) Short pins ⑱ and ㉑ of IC5 on SB-F Board by soldering lead wire, etc. (See Fig. 8-52)
   iii) Mount Upper Housing back on, and tighten two screws ❶ and two screws ❷ (See Fig. 8-51).

Notes:
- When connecting AC-V8E/UB to Track Shifting and Monitoring Jig, be sure to modify it by the above steps in advance.
- When power is supplied with a modified AC-V8E/UB, a little pushing the AC-V8E/UB switch off.

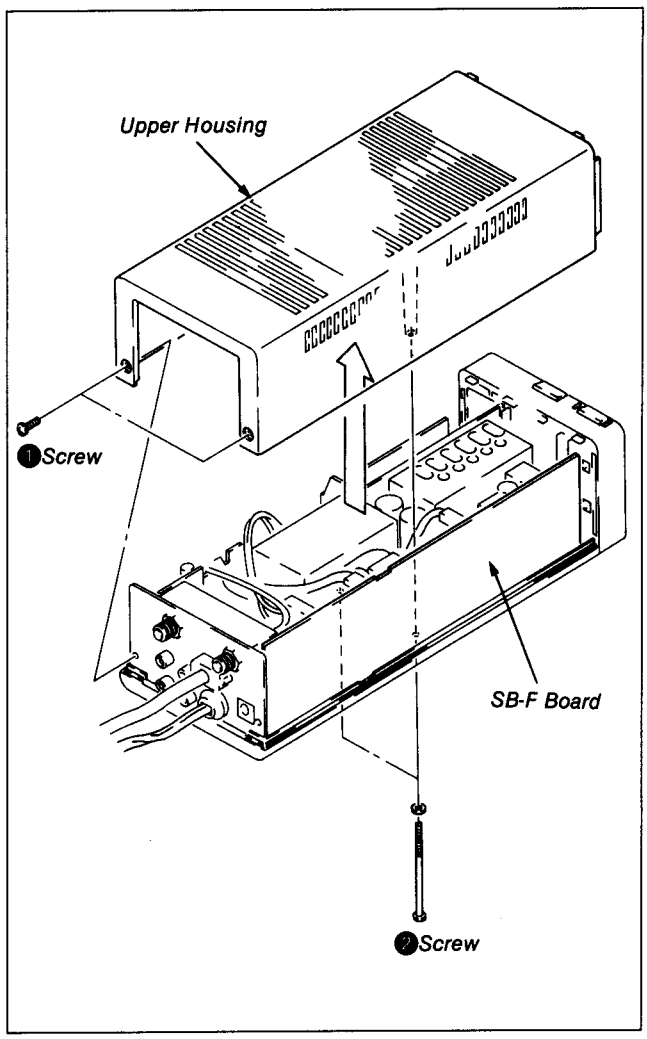


Fig. 8-51.

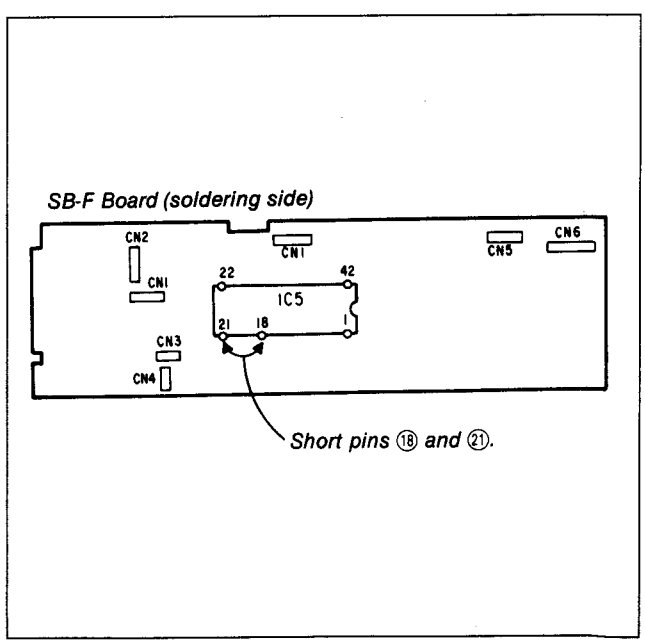


Fig. 8-52.

8-4-2. Preparation for Adjustment

1) Clean the tape running surfaces (tape guide, drum, capstan shaft, pinch roller).
2) Referring to 8-4-1 Connection Diagram of Track Shift & Monitor Jig, connect the track shift & monitor jig and set the jig switch.
3) Connect the oscilloscope.
   1CH: CN2 terminal of the track shift & monitor jig (output of the CH2 head)
   2CH: RF SWP terminal of the track shift & monitor jig (external trigger)
4) Playback the tracking alignment tape (WR5-1C)
5) Turn the track shift knob of the track shift & monitor jig to maximize the amplitude of a RF waveform. (Refer to Fig. 8-53.) When the RF waveform is unstable and difficult to adjust, made adjustment after turning on the ATF LOCK switch. Then, return it to "OFF" after adjustment.

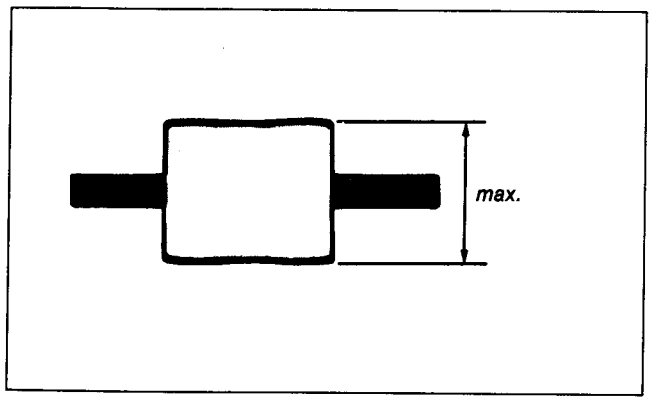


Fig. 8-53.

6) Confirm that the RF waveform of the oscilloscope is flat at both inlet and outlet sides. (Refer to Fig. 8-54 ⓐ.) When it is not flat, adjust as follows:
   - When the RF waveform at the inlet/outlet side is not flat; (Refer to Fig. 8-54 ⓑ or ⓒ.)
     After making tracking coarse adjustment in 8-4-3, make tracking fine adjustment in 8-4-4.

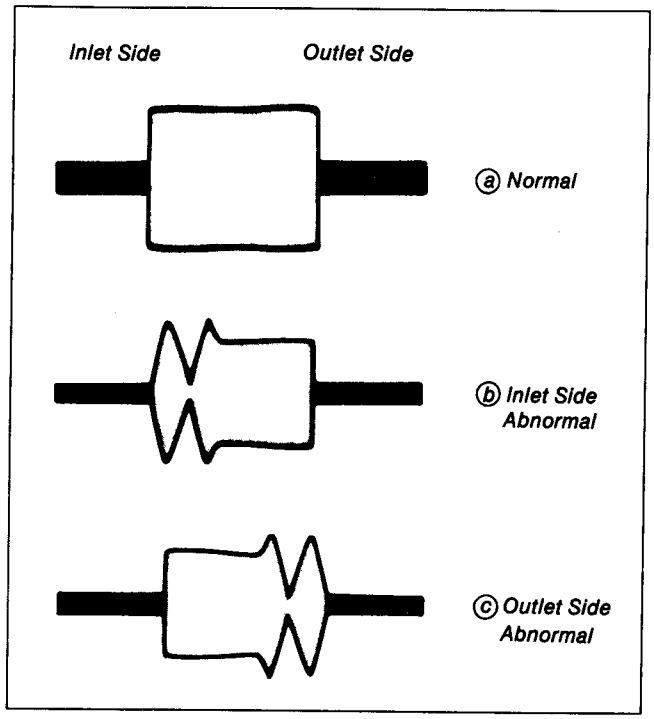


Fig. 8-54.

7) When the RF waveform is normal, proceed to 8-4-8 checks after Adjustment.

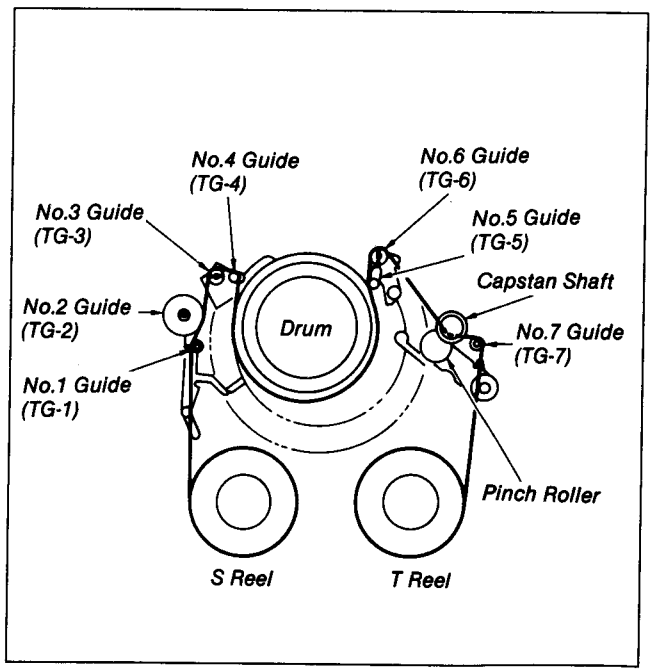


Fig. 8-55.

8-4-3. Tracking Coarse Adjustment

1) Playback the tracking alignment tape.
2) Turn the track shift knob of the track shift & monitor jig to maximize the amplitude of the RF waveform. (Refer to Fig. 8-53.)
3) Loosen the lock screw ❶ of the No. 3 guide (TG-3) and turn the No.3 guide to make flat the waveform at the inlet side. (Refer to Fig. 8-56.)
4) Loosen the lock screw ❶ of the No.6 guide (TG-6) and turn the No.6 guide to make flat the waveform at the outlet side. (Refer to Fig. 8-57.)

Note:

Be careful not to loosen the lock screw too much because the guide will be easily moved.

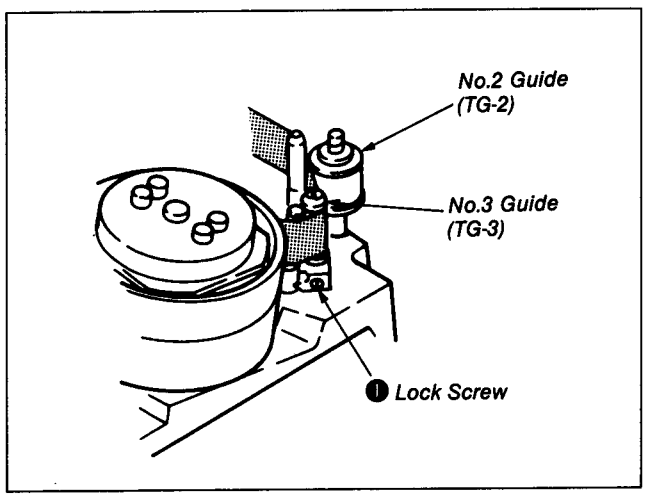


Fig. 8-56.

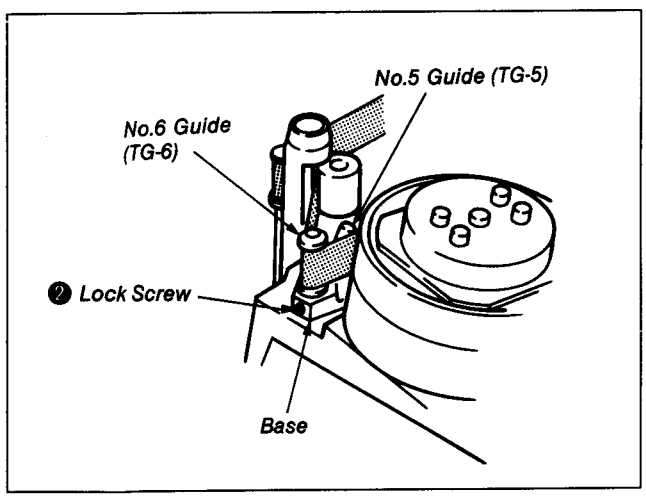


Fig. 8-57.

8-4-4. Tracking Fine Adjustment

1) Play back the tracking alignment tape, and turn the track shift knob of the track shift & monitor jig in the counter clockwise direction to adjust the amplitude of the RF waveform to two-thirds of its maximum. (Refer to Fig. 8-57.)

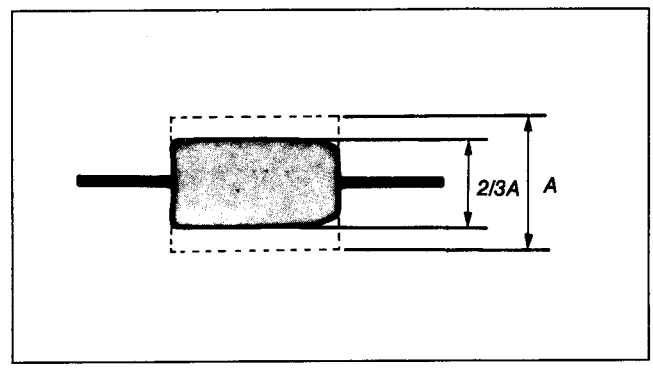


Fig. 8-58.

2) Confirm whether or not the waveform is flat. When it is not flat, turn the No.3 and No.6 guides (TG-3 and TG-6) to make it flat. (Refer to Fig. 8-56, 8-57)
3) Tighten the lock screw of the No.3 guide to lock it. When this is done, confirm that the waveform at the inlet side does not change.
4) Tighten the lock screw of the No.6 guide to lock it. When this is done, confirm that the waveform at the outlet side does not change.

Note:

When tightening the lock screw of the No.6 guide, turn the lock screw with the base gently held down lest the tip of the No.5 guide (TG-5) should touch the drum. (Refer to Fig. 8-57.)

8-4-5. No.2 Guide (TG-2) Adjustment

When the No.2 guide is turned or replaced, adjust it after presetting a height.

- No.2 guide height presetting

1) Screw in until the slit of the TG-2 nut comes as high as the top of the TG-2 shaft. (Fig. 8-59 ⓐ)
   Note:
   Preset the height after completely removing screw lock.
2) Turn the TG-2 nut 1/2 times in the clockwise direction. (Fig. 8-59 ⓑ)

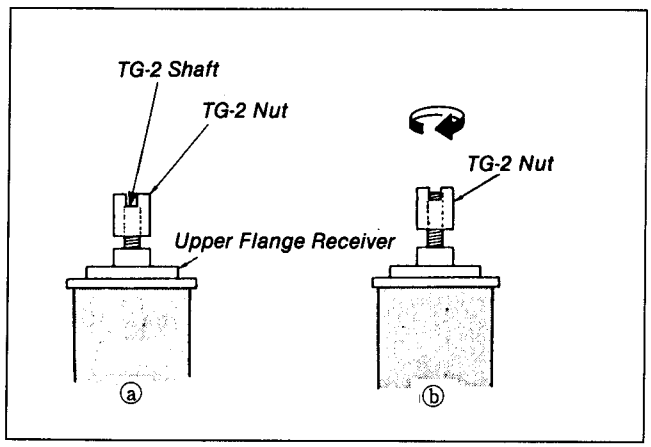


Fig. 8-59.

- No.2 guide (TG-2) adjustment

1) Play back the tracking alignment tape.
2) Turn off the SEL switch of the track shift & monitor jig.
3) Confirm the waveform in the REV mode. (Refer to Fig. 8-60.)
   Note:
   Make confirmation at the beginning of the alignment tape.

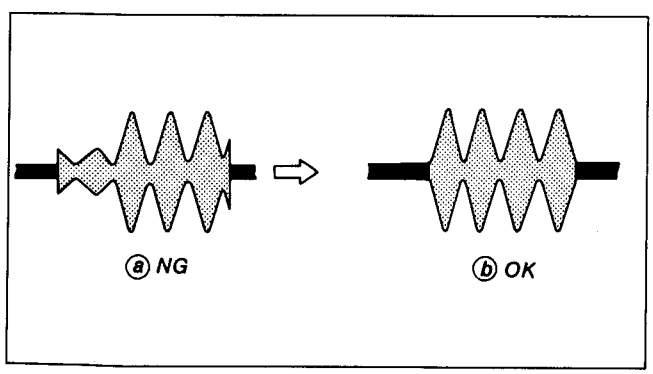


Fig. 8-60.

- When a normal waveform is not obtained (Fig. 8-60 ⓐ); Preset the No.2 guide height and go through the following adjustment:

4) Turn the TG-2 nut by 90° in the clockwise direction and take the step 3) again. Repeat the steps 3) and 4).
   At this time, confirm that the tracking waveform (Fig. 8-58) has not changed. If changed, make tracking fine adjustment at the inlet side and take the step 3) again.
5) Tighten the lock screw of the No.3 guide (TG-3). When this is done, confirm that the waveform at the inlet side does not change.
6) Apply screw lock to the No.2 guide (TG-2).

8-4-6. No.7 Guide (TG-7) Adjustment

1) Play back the tracking alignment tape and select the REV mode.
2) Confirm that there is no tape deflection between the No.6 guide (TG-6) and capstan. (Refer to Fig. 8-61.) When the tape has a deflection, adjust to remove the deflection by turning the No.7 guide (TG-7).
3) Once again in the PLAYBACK mode, confirm that there is no tape deflection between the No.7 guide (TG-7) and capstan. (allowable tape deflection = less than 0.5mm)
   When the tape has a deflection, adjust to remove the deflection by turning the No.7 guide (TG-7).

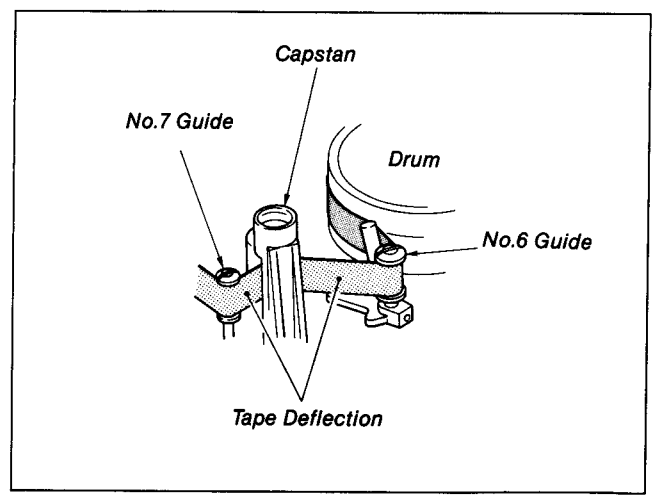


Fig. 8-61.

8-4-7. CUE and REV Waveform Confirmation

1) Playback the tracking alignment tape and select the REV mode. At this time, waveform peak pitches should be uniform. (Refer to Fig. 8-62 ⓐ.)
   When they are not uniform, make tracking fine adjustment (8-4-4) and No.2 guide adjustment (8-4-5).
2) Select the CUE mode. At this time, waveform peak pitches should be uniform. (Refer to Fig. 8-62 ⓑ.) When they are not uniform, make tracking fine adjustment (8-4-4).

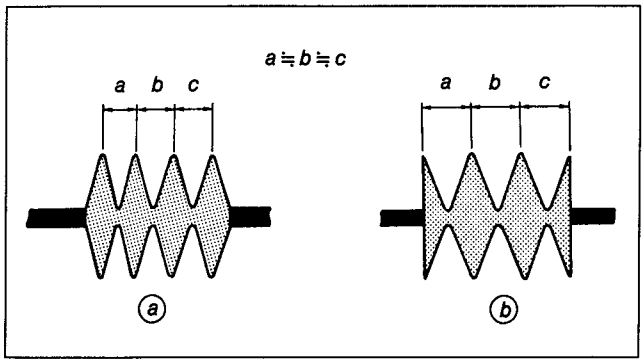


Fig. 8-62.

8-4-8. Checks after Adjustment

1. Tracking Check

1) Playback the tracking alignment tape. Turn the track shift knob of the track shift & monitor jig to adjust the amplitude of the RF waveform to two-thirds of its maximum. (Refer to Fig. 8-63.)
2) When this is done, confirm that an amplitude's minimum value (EMIN) is more than 80% of its maximum value (EMAX). (Refer to Fig. 8-64.)
3) Confirm that the waveform does not fluctuate greatly. (Refer to Fig. 8-65.)

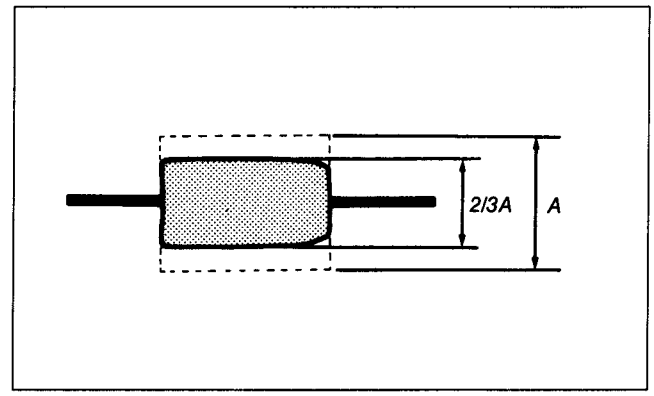


Fig. 8-63.

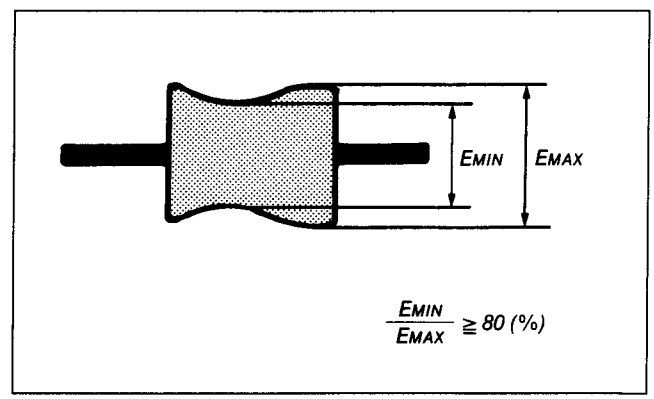


Fig. 8-64.

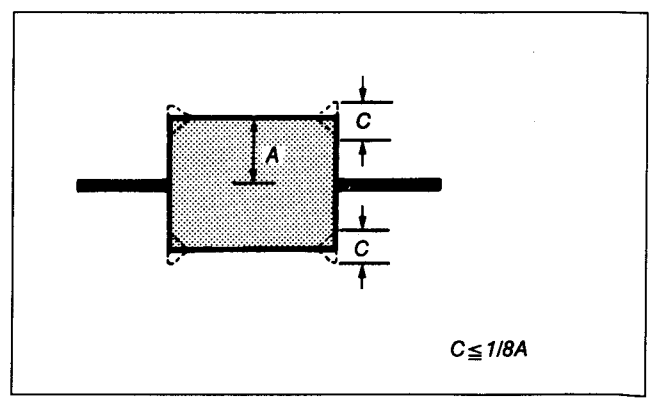


Fig. 8-65.

2. Rise Check

1) Playback the tracking alignment tape.
2) Turn the track shift knob of the track shift & monitor jig to maximize the amplitude of the RF waveform.
3) Eject the tape once, and then, load it again.
4) In the PLAYBACK mode, confirm that the RF waveform horizontally rises within 1 second. Confirm also at this time that there is no tape deflection around the pinch roller. (Refer to Fig. 8-66.)
5) Playback after CUE/REV and FF/REW, and confirm that the RF waveform horizontally rises within 1 second. Confirm also at this time that there is no tape deflection around the pinch roller.
6) Repeat the steps 3) through 5).

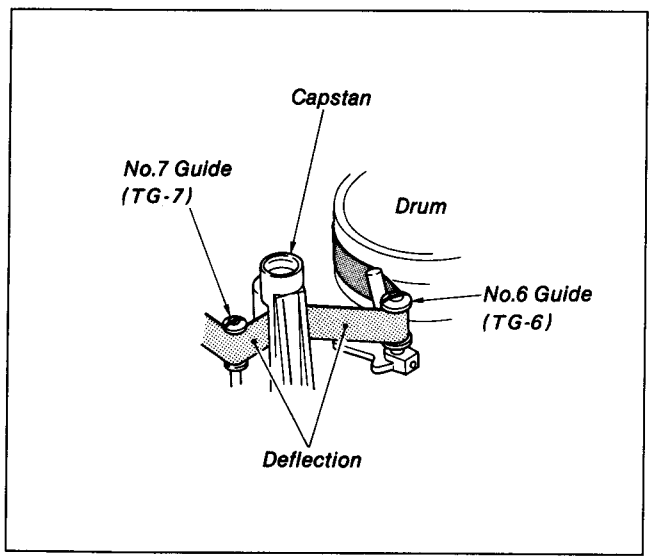


Fig. 8-66.

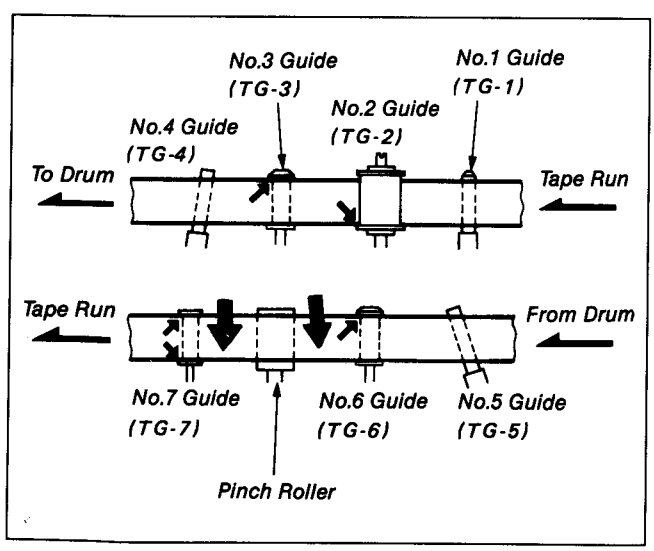


Fig. 8-67.

3. Tape Run Check

Select the PLAYBACK mode, and confirm that the No.2 guide lower flange, No.3 guide upper flange and No.6 guide upper flange have no clearance or large curl, and that the No.7 guide upper and lower flanges have no curl. (Refer to Fig. 8-67.)

SECTION 9
ELECTRICAL ADJUSTMENT (VIDEO)

During the adjustment see the parts location diagram relevant the adjustment on page 284.

The following measuring instruments are needed in adjusting the VTR section:

[Equipment Required]

1) Monitor TV
2) AC adapter
3) Oscilloscope Dual-trace, Bandwidth more than 10MHz with delay mode (Use a probe of 10:1, unless otherwise specified.)
4) Frequency Counter
5) Pattern generator with video output terminal
6) Digital voltmeter
7) Audio generator
8) Audio level meter
9) Audio distortion meter
10) Audio attenuator
11) Regulated DC power supply unit
12) Alignment Tape
    Tracking adjustment (WR5-1C)
        Parts Code: 8-967-995-06
    Video frequency response adjustment (WR5-2C)
        Parts Code: 8-967-995-16
    Operation check (WR5-3CL)
        Parts Code: 8-967-995-36
    Operation check (WR5-3CSP)
        Parts Code: 8-967-995-27

[Precautions for Adjustment]

The video section can be also adjusted with the camera section and EVF removed, excluding "Battery Failure Adjustment" in System Control Adjustment and "EVF display position adjustment" in Video System Adjustment. When removing the camera section and EVF section, disconnect the following 5 connectors:

1. MV-12 board: CN203 (black)
2. MV-12 board: CN206
3. MV-12 board: CN207 (EVF 8-pin socket)
4. SS-70 board: CN305 (white)
5. SS-70 board: CN307 (white)

[Equipment Connection]

Unless otherwise specified, adjustment is made by connecting the measuring instruments as shown in the figure below.

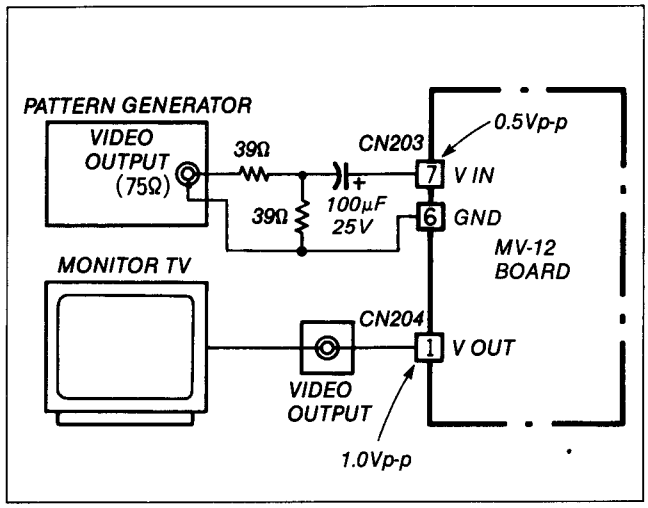


Fig. 9-1.

[Set-up during adjustment]

Since the video output signal obtained from the pattern generator is used as the adjusting signal of the VTR block adjustment, it is necessary that this video output signal has to be within the specification. Connect an oscilloscope to Pin ⑫ (CAM IN) of VY-9 Board on the MV-12 board and make sure that the amplitude of the video SYNC signal is approximately 0.15V, that the video block is approximately 0.35V, that the burst signal is 0.15V with flat characteristics, and the signal level ratio between the burst signal and "Red" signal is 0.30: 0.66.

The video signal (colour bar) used in the VTR block adjustment is an shown in Fig. 9-2.

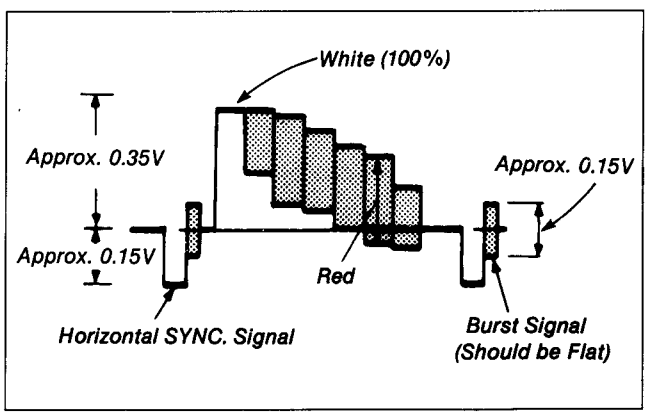
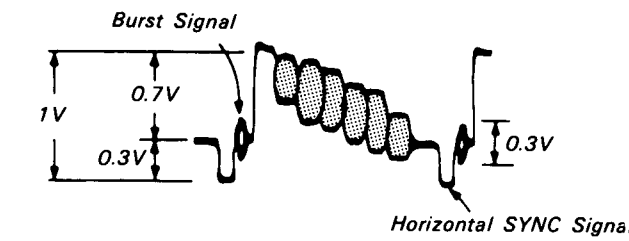
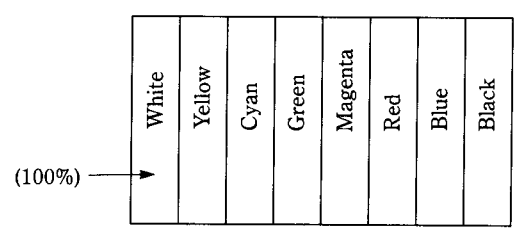


Fig. 9-2. Colour bar signal of pattern generator

[Alignment Tape]

Tape	Content	Use
Tracking (WR5-1C)	1. Recording area PCM — Video 2. Recording content: CH2: 1MHz linearity adjustment signal (CH1: 9MHz)	Drum linearity adjustment
Video frequency Response (WR5-2C)	1. Recording area Video 2. Recording content RF sweep 0 to 10MHz 3. Marker 1, 3.58, 5.5 and 7MHz	Frequency characteristic adjustment
Operation checking SP mode (WR5-3CSP) LP mode (WR5-3CL) Note: PCM area is not included in WR5-3CL.	1. Recording area Video 2. Recording content ■Video track ●Video signals Colour bar: 10 sec. Monoscope: 8 sec. Iterative (Colour bars)   ●Audio signal (AFM) 400Hz, 60% modulation ■PCM track (WR5-3CSP only) ●Audio signal (PCM) 1kHz, ... 10 sec. 20Hz, ... 2 sec. 400Hz, ... 4 sec. 14kHz, ... 2 sec. } Iterative	Operation checking

[Input/output levels and impedance]

Video output Pin jack
Output signal: 1 Vp-p, 75Ω unbalance, negative SYNC
Mic input Mini jack
Input level: −66dBs, low impedance
Audio output Pin jack
Specified output: −10dBs with 47kΩ load
Loading impedance: Over 10kΩ

9-1. POWER SUPPLY ADJUSTMENT

Note:

Adjust the power supply with the following connections given.

[Connection]

1) Remove the AC PACK or BATTERY from the battery grip.
2) From the regulated-DC power supply unit, connect the "+" side to the CN205 pin ③ (DD UNREG) of the MV-12 board and the "−" side to the CN205 pins ① and ② (UNREG GND), and then, turn on 6.3±0.1Vdc.
3) Connect with a jumper between the CN201 pin ㉞ (VTR DD ON) of the MV-12 board and GND.

9-1-1. DC/DC Converter Frequency Adjustment (MV-12 Board)

Measurement point	Q653 collector
Measurement equipment	Frequency counter
Adjustment element	RV651
Specified value	475±5kHz

[Adjustment Method]

1) Adjust the frequency to 475±5kHz with RV651.

9-1-2. DC/DC Converter Output Voltage Adjustment (MV-12 Board)

Measurement point	Pin ⑦⓪ of the VC-11 board
Measurement equipment	Digital voltmeter
Adjustment element	RV652
Specified value	5.10±0.05Vdc

[Adjustment Method]

1) Adjust the voltage to 5.10±0.05Vdc with RV652.

9-2. SYSTEM CONTROL ADJUSTMENT

9-2-1. Battery Failure Adjustment (MR-8 Board)

Note:

Remove the electronic view finder and turn the focus switch to manual position.

Mode	RECORD
Subject	Arbitrary
Measurement point	CN505 pin ① ($\overline{\text{BATT DOWN}}$) (SS-70 board)
Measurement equipment	Oscilloscope (DC range)
Adjustment element	RV156
Specified value	5.79±0.01Vdc

[Connection]

1) Remove the AC PACK or BATTERY from the battery grip.
2) Connect the regulated DC power supply as shown in Fig. 9-3.

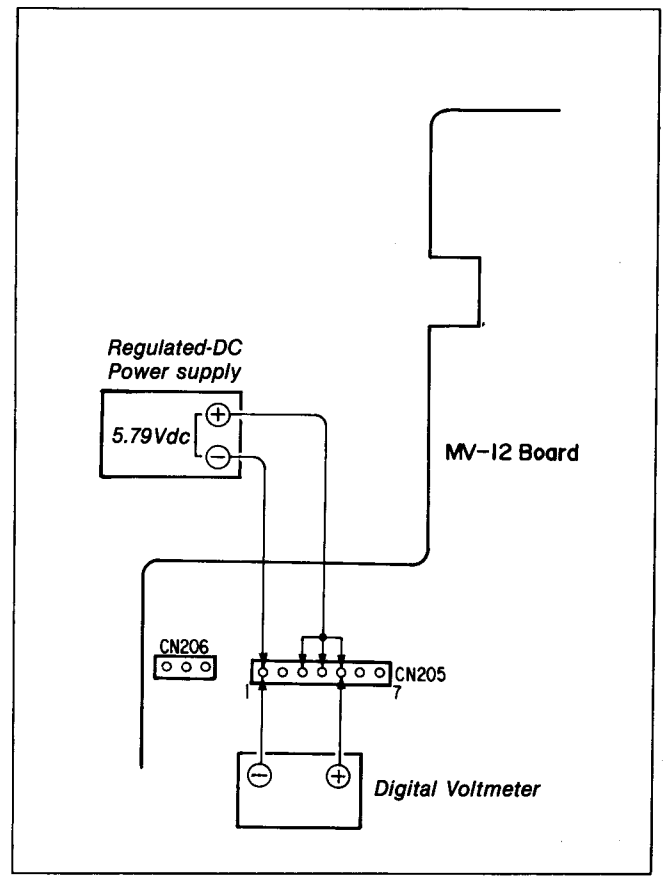


Fig. 9-3.

Note:

Adjust with the camera section connected.

[Adjustment Method]

1) Adjust the output voltage of the regulated DC power supply unit so that the digital voltmeter will indicate 5.79±0.01 Vdc. (VTR in a recording state)
2) Rotate RV156 slowly and set to the point where the DC level of the CN505 pin ① of the SS-70 board is about to change from "H" to "L".

[Checking Method]

Check as follows, and make readjustment when its result is not satisfactory:

Note:

Mount the electronic view finder and turn the focus switch to manual position.

1) Adjust the output voltage of the regulated DC power supply unit so that the digital voltmeter will indicate 6.03±0.01 Vdc. (VTR in a recording state)
2) Check that characters "BATTERY" within the EVF are not lit up, and that the TALLY lamp is not blinking.
3) Lower the output voltage of the stabilized power supply unit so that the digital voltmeter will indicate 5.75±0.01 Vdc.
4) Check that the characters "BATTERY" within the EVF and the TALLY lamp are blinking every other second.

9-3. SERVO SYSTEM ADJUSTMENT

9-3-1. Drum Free Speed Adjustment (MR-8 Board)

Mode	PLAYBACK
Signal	Any tape
Measurement point	CN505 pin ⑤ (ADE) (SS-70 board)
Measurement equipment	Digital voltmeter
Adjustment element	RV155
Specified value	2.1 ± 0.1Vdc

[Adjustment Method]

1) Adjust to 2.1 ± 0.1Vdc with RV155.

9-3-2. Capstan Free Speed Adjustment (MR-8 Board)

Mode	PLAYBACK
Signal	Any tape
Measurement point	CN505 pin ② (C FG) (SS-70 board)
Measurement equipment	Frequency counter
Adjustment element	SP mode: RV151 LP mode: RV152
Specified value	SP mode: 1,151.5 ± 2Hz LP mode: 575.75 ± 1.5Hz

[Connection]

1) Connect TP105 on the MR-8 board and GND with a 220μF/16V electrolytic capacitor. (GND to the negative pole side of the capacitor)
2) Connect the TP351 and TP352 of the SK-15 board with a diode (1SS119 or equivalent) for set up TEST mode.

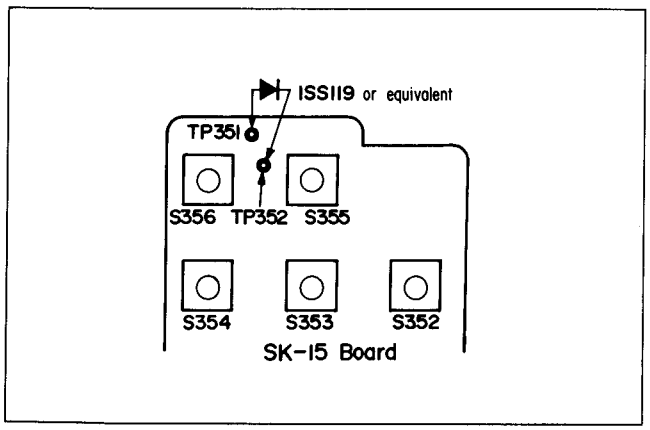


Fig. 9-4.

[Adjustment Method]

Adjustment for the LP mode is given in brackets [ ].

1) Set the SP/LP switch (S201 on the MV-12 board) to SP [LP] position.
2) In the PLAYBACK mode, adjust to 1,151.5 ± 2Hz [575.75 ± 1.5Hz] with RV151 [RV152].

Note:

Be sure to adjust SP mode in advance.

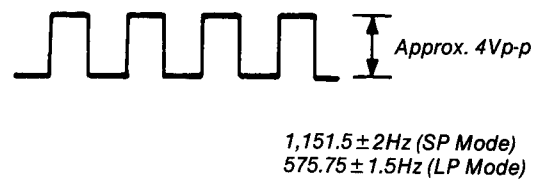


Fig. 9-5.

9-3-3. Switching Position Adjustment (MR-8 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP)
Measurement point	CH1: Video output terminal CH2: MR-8 board CN105 pin ② (RF SWP)
Measurement equipment	Oscilloscope
Adjustment element	RV153
Specified value	6.5 ± 0.3H (416 ± 20μsec)

[Adjustment Method]

1) Adjust to 6.5 ± 0.3H (416 ± 20μsec) with RV153.

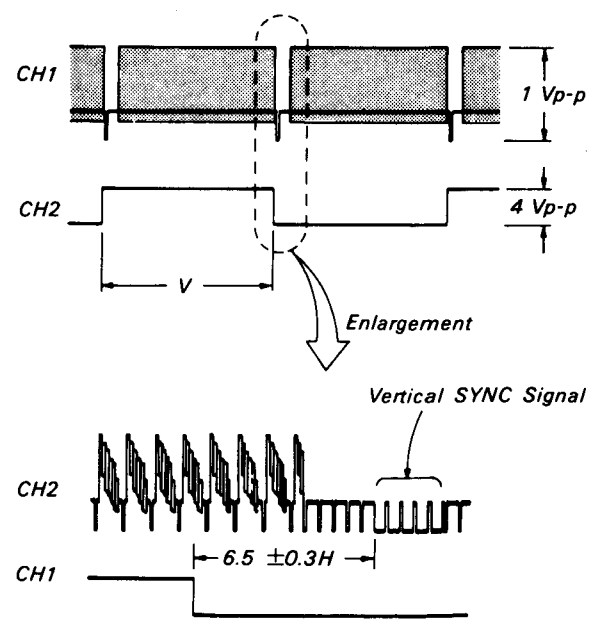


Fig. 9-6.

9-3-4. ATF BPF Balance Adjustment (SS-70 Board)

Mode	PLAYBACK
Signal	See Fig. 9-7.
Measurement point	
Measurement equipment	Oscilloscope, audio generator and frequency counter
Adjustment element	RV502
Specified value	A 16kHz signal level (IC507 pin ⑪) should be equal to a 47kHz signal level (IC507 pin ⑫).

[Connection]

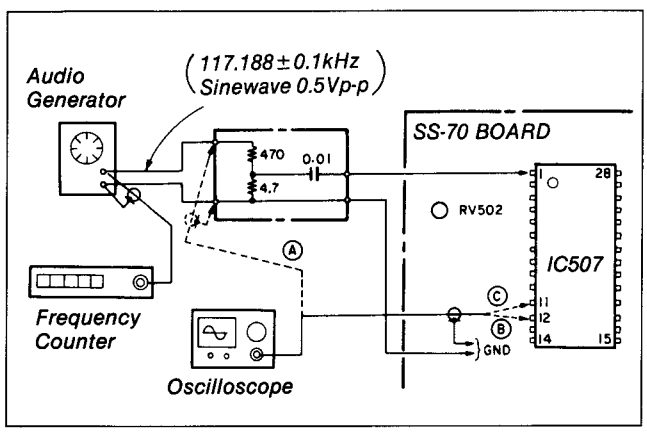


Fig. 9-7.

[Adjustment Method]

1) Check the output level of the audio generator with the oscilloscope, and adjust the output level so that a sine wave output level will come to approximately 0.5Vp-p. (Fig. 9-7 Ⓐ)
2) Adjust the oscillation frequency of the audio generator so that the frequency counter will indicate 117.188 ± 0.1kHz.
3) Playback an arbitrary tape.
4) Connect the oscilloscope to the IC507 pin ⑫ and read a 47kHz signal level (approx. 2Vp-p). (Fig. 9-7 Ⓑ)
5) Connect the oscilloscope to the IC507 pin ⑪. (Fig. 9-7Ⓒ)
6) Make the 16kHz signal level equal to the 47kHz signal level with RV502.

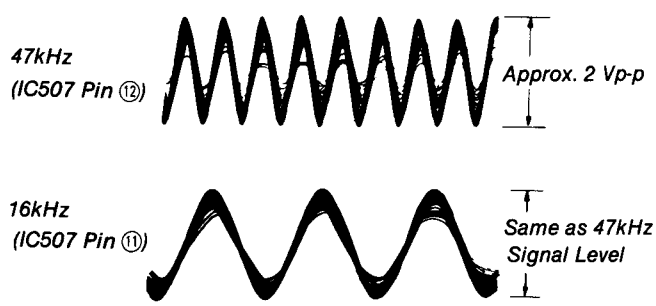


Fig. 9-8.

9-4. VIDEO SYSTEM ADJUSTMENT

In principle adjust the video system in the following procedure. Color video signals fed by a pattern generator are utilized as video input signals for video system adjustment in the RECORD mode. Check that the SYNC and color burst signals match the standard designated in Fig. 9-2.

[Adjustment procedure]

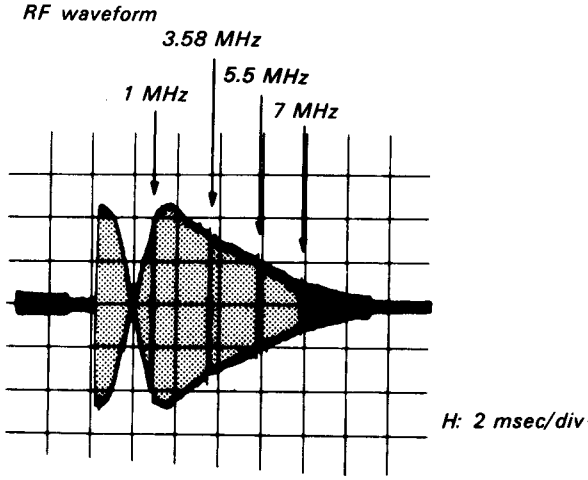
1) Playback frequency characteristics adjustment
2) Flying erase check
3) X'tal oscillator fo adjustment
4) Chroma comb filter adjustment
5) Y comb type filter adjustment
6) SYNC AGC adjustment
7) VIDEO OUT level adjustment
8) PB Y level adjustment
9) Y FM carrier frequency adjustment
10) Y FM deviation adjustment
11) White clip adjustment
12) 375fH VCO adjustment
13) Chroma emphasis fo adjustment
14) Carrier balance adjustment
15) GCA adjustment
16) fH VCO adjustment
17) REC Y recording current adjustment
18) REC C recording current adjustment
19) REC AFM recording current adjustment
20) REC ATF recording current adjustment
21) EVF Internal display position adjustment

9-4-1. Playback Frequency Characteristic Adjustment (RP-34/MR-8 Boards)

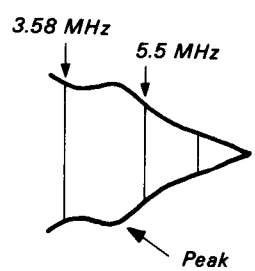
CH2 adjustment is shown in brackets [ ].

Mode	PLAYBACK
Signal	Alignment tape: Frequency characteristic adjustment (WR5-2C)
Measurement point	CN105 pin ④ [③] of MR-8 BOARD External trigger: CN105 pin ② of MR-8 BOARD Trigger slope: + [−]
Measurement equipment	Oscilloscope
Adjustment element	RV003 [RV004] of the RP-34 board
Specified value	3.58MHz level : 5.5MHz level = 4:3

a) RF waveform



b)



c)

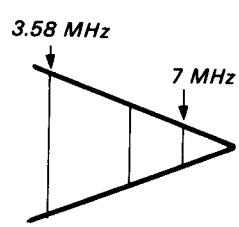


Fig. 9-9.

[Adjusting method]

1) Adjust with RV003 [RV004] on the RP-34 board so that peak appears in the envelope of the RF waveform. (See Fig. 9-9. b))
2) Adjust with RV003 [RV004] on the RP-34 board so that the peak of the RF waveform envelope becomes small and the waveform from 3.58MHz to 7MHz section becomes almost a straight line. (See Fig. 9-9. c))
   At this point, be sure to confirm that the level difference ratio between 3.58MHz and 5.5MHz is approximately 4:3 [4:3].
3) Perform self recording and be sure to confirm that there are no occurrence of black noise and white noise due to over modulation.

9-4-2. Flying Erase Check (MR-8 Board)

Mode	RECORD
Signal	Arbitrary
Measurement point	TP104 (FE(X))
Measurement equipment	Oscilloscope and frequency counter
Specified value	Frequency: More than 7.4MHz Voltage: More than 7.0Vp-p

[Checking Method]

1) Check that an oscillation frequency is more than 7.4MHz and an oscillation voltage is more than 7.0Vp-p.

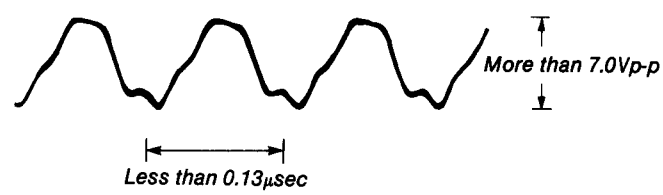


Fig. 9-10.

9-4-3. X'tal Oscillator fo Adjustment (VC-11/MV-12 Boards)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP)
Measurement point	Pin ⑤⑤ of the VC-11 board
Measurement equipment	Frequency counter
Adjustment element	CV001 of the VC-11 board
Specified value	4,433,619±50Hz

Note:

Connect the frequency counter through a buffer with high impedance (approx. 10MΩ) and low capacity (less than 10 pF).

[Adjustment Method]

1) Adjust to 4,433,619±50Hz with CV001 of the VC-11 board.

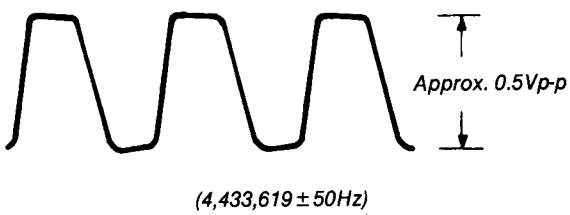


Fig. 9-11.

9-4-4. Chroma Comb Filter Adjustment (VD-6/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑳ of the VD-6 board
Measurement equipment	Oscilloscope
Adjustment element	RV002 on VD-6 board and LV201 of the MV-12 board
Specified value	Minimum residual chroma component

[Connection]

1) Connect Pin ㊵ of VY-9 board to GND with a jumper wire.

[Adjustment Method]

1) Adjust with RV002 of the VD-6 board and LV201 of the MV-12 board alternately so that the residual chroma component becomes minimum.

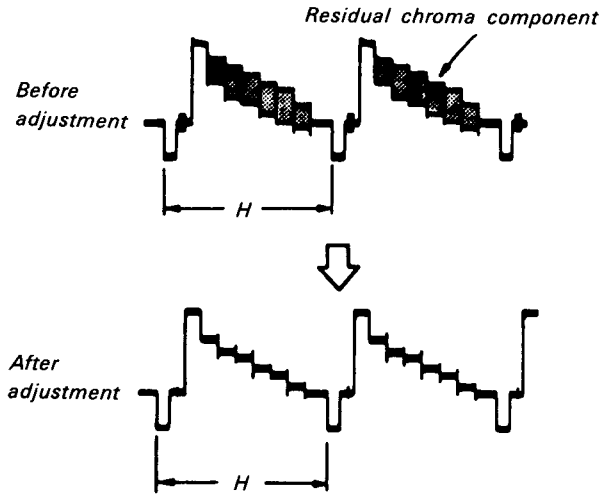


Fig. 9-12.

9-4-5. Y Comb Type Filter Adjustment (VD-6/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑩ of the VD-6 board (TP203)
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the VD-6 board
Specified value	The amplitude between the yellow level center and the pedestal is 50±25mVp-p.

Note:

Be sure to connect a 22kΩ of resistor in series between Pin ⑩ on the VD-6 board and 10:1 probe.

[Adjustment Method]

1) Adjust with RV001 of the VD-6 board so that the amplitude between the yellow level center and pedestal becomes 50±25mVp-p.
2) While playing back a tape in which dropouts are recorded, be sure to confirm that these dropouts are not discernible. In the event the dropouts become discernible, adjust with RV001 so that they become undiscernible.

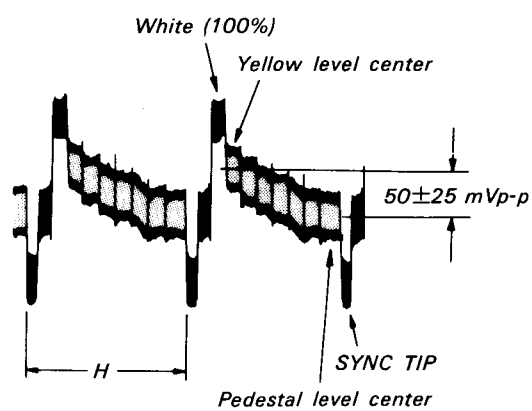


Fig. 9-13.

9-4-6. SYNC AGC Adjustment (VY-9/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑤⓪ of the VY-9 board
Measurement equipment	Oscilloscope
Adjustment element	RV006 of the VY-9 board
Specified value	0.50 ± 0.05Vp-p

[Adjustment Method]

1) Adjust to 0.50 ± 0.05Vp-p with RV006 of the VY-9 board.

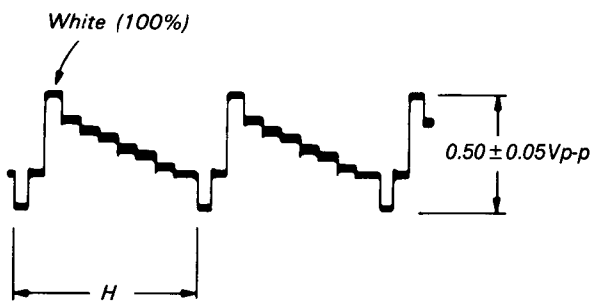


Fig. 9-14.

9-4-7. VIDEO OUT Level Adjustment (VY-9/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement equipment	VIDEO OUT terminal of the FP-49 board
Measurement equipment	Oscilloscope
Adjustment element	RV005 of the VY-9 board
Specified value	1.00 ± 0.05Vp-p

Note:

Terminate the VIDEO OUT terminal with a 75Ω resistor.

[Adjustment Method]

1) Adjust to 1.00 ± 0.05 Vp-p with RV005 of the VY-9 board.

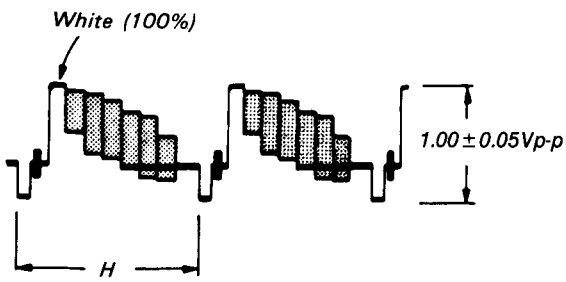


Fig. 9-15.

9-4-8. PB Y Level Adjustment (VY-9/MV-12 Boards)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), colour bar portion
Measurement point	VIDEO OUT terminal of the FP-49 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the VY-9 board
Specified value	1.00 ± 0.05Vp-p

Notes:

1) Terminate the VIDEO OUT terminal with a 75Ω resistor.
2) The EDIT (SP/LP) switch (MV-12 board, S201) should be OFF (SP) position.

[Adjustment Method]

Adjust to 1.00 ± 0.05 with RV001 of the VY-9 board.

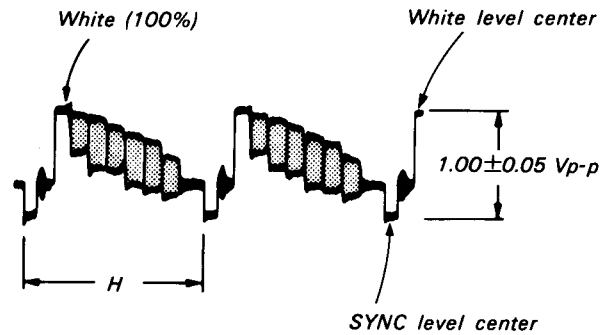


Fig. 9-16.

9-4-9. Y FM Carrier Frequency Adjustment (VY-9/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	None
Measurement point	Pin ㉙ (REC Y RF) of the VY-9 board
Measurement equipment	Frequency counter
Adjustment element	RV004 of the VY-9 board
Specified value	4.20 ± 0.03MHz

[Adjustment Method]

1) Set RV003 (AC CLIP) of the VY-9 board to the mechanical center (slide terminal for RV003 being approx. 2.7Vdc).
2) Adjust to 4.20 ± 0.03MHz with RV004 of the VY-9 board.
3) Make "deviation adjustment" and "AC clip adjustment".

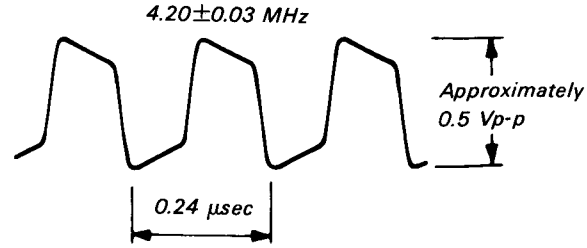


Fig. 9-17.

9-4-10. Y FM Deviation Adjustment (VY-9/MV-12 Boards)

Mode	RECORD and PLAYBACK
Signal	Colour bar
Measurement point	VIDEO OUT terminal of the FP-49 board
Measurement equipment	Oscilloscope
Adjustment element	RV002 of the VY-9 board
Specified value	Playback level at 1.00 ± 0.05Vp-p

Note:

1) Terminate the VIDEO OUT terminal with a 75Ω resistor.
2) "VIDEO OUT level adjustment", "PB Y level adjustment" and "Y FM carrier frequency adjustment" should be already completed.
3) The EDIT (SP/LP) switch (MV-12 board, S201) should be OFF (SP) position.

[Adjustment Method]

1) Record colour bar signal.
2) Playback a recorded portion.
3) Confirm a playback output level.
   Standard: 1.00 ± 0.05Vp-p
4) When the standard is not met, repeat the abovementioned steps 1) through 3) after turning RV002 of the VY-9 board as follows:

	RV002 Rotating Direction
Larger than specified value	Clockwise (↻)
Smaller than specified value	Counter-clockwise (↺)

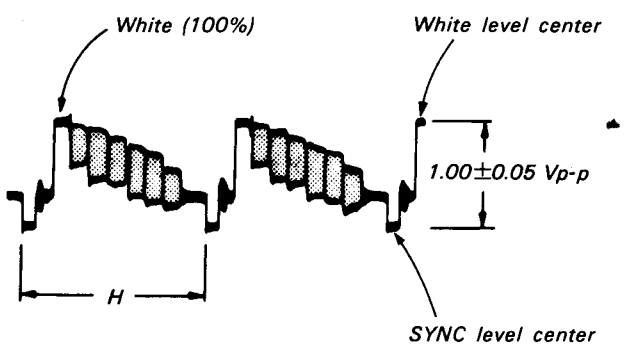


Fig. 9-18.

9-4-11. White Clip Adjustment (VY-9/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ㉟ of the VY-9 board
Measurement equipment	Oscilloscope
Adjustment element	RV003 of the VY-9 board
Specified value	235±10%

[Adjustment Method]

1) Adjust the peak of white (100%) to 235 ± 10% with RV003 of the VY-9 board.

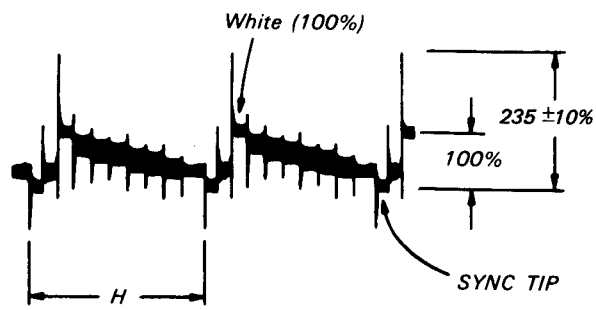


Fig. 9-19.

9-4-12. 375fH VCO Adjustment (VC-11/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ㊵ of the VC-11 board
Measurement equipment	Digital voltmeter
Adjustment element	RV002 of the VC-11 board
Specified value	3.0 ± 0.4Vdc

[Adjustment Method]

1) Adjust to 3.0 ± 0.4Vdc with RV002 of the VC-11 board.

9-4-13. Chroma Emphasis fo Adjustment (MV-12 Board)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑧ of the VC-11 board
Measurement equipment	Oscilloscope
Adjustment element	FL203 of the MV-12 board
Specified value	Be sure to confirm that the fo component is minimum and zero cross appears between green and magenta.

[Connection]

Connect the following two places of the VC-11 board with 47kΩ resistors.

1. ⑪ PIN (ACC) — ⑫ PIN (GND)
2. ⑪ PIN (ACC) — ⑩ PIN (REG 5V)

[Adjustment Method]

1) Adjust with FL203 of the MV-12 board so that the amplitude of the flat cyan section of the chroma signal becomes minimum.
   At this point, be sure to confirm that the zero cross appears between the green and magenta.

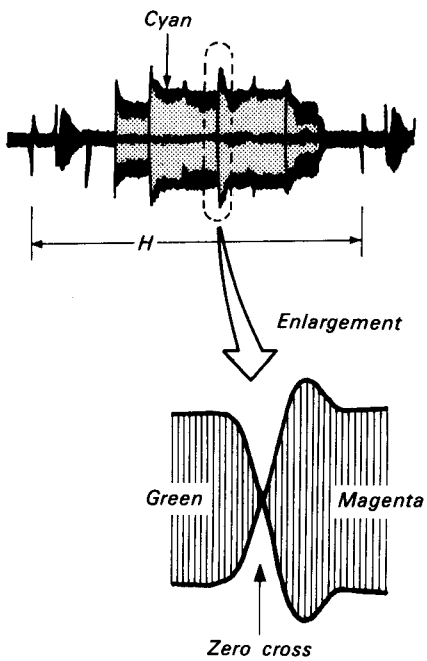


Fig. 9-20.

9-4-14. Carrier Balance Adjustment (VC-11/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour Bar
Measurement point	Pin ⑭ of the VC-11 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the VC-11 board
Specified value	5.17MHz component at minimum

[Adjustment Method]

1) Minimize 5.17MHz component with RV001 of the VC-11 board.

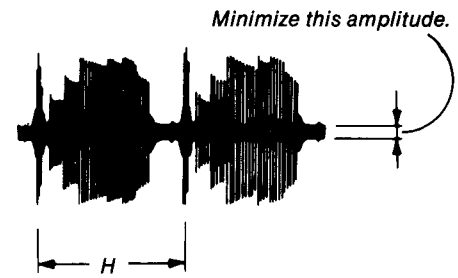


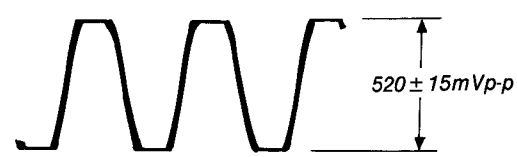
Fig. 9-21.

9-4-15. GCA Adjustment (VC-11/MV-12 Boards)

Mode	Playback
Signal	Arbitrary tape
Measurement point	Pin ⑭ of the VC-11 board
Measurement equipment	Oscilloscope
Adjustment element	RV003 of the VC-11 board
Specified value	520 ± 15mVp-p

[Adjustment Method]

1) Adjust with RV003 of the VC-11 board so that it becomes 520 ± 15mVp-p.
2) Set to either the STILL, CUE or REVIEW mode, and be sure to confirm that the thickness of the colour does not differ from that of the playback mode. If necessary, adjust with RV003. (Be sure to playback a tape of LP mode.)



4.43 MHz

Fig. 9-22.

9-4-16. f_H VCO Adjustment (VC-11/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	CH1: Pin ⑤③ of the VC-11 board CH2: VIDEO OUT terminal of the FP-49 board
Measurement equipment	Oscilloscope
Adjustment element	RV004 of the VC-11 board
Specified value	14.5 ± 0.2μsec

[Adjustment Method]

1) Adjust RV004 of the VC-11 board so that the T_R of CH1 is 14.5 ± 0.2μsec.
2) Confirm that the H (time) of CH1 and CH2 is stable.

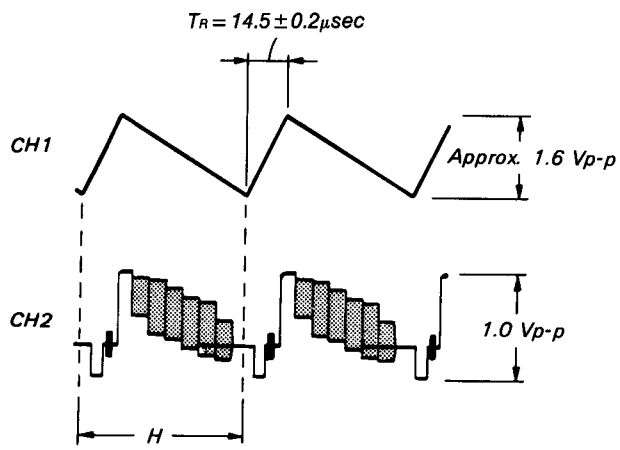


Fig. 9-23.

9-4-17. REC Y Recording Current Adjustment (RP-34/MR-8 Boards)

Mode	RECORD
Signal	None
Measurement point	TP101 (CH1 CHECK) of the MR-8 board
Mesurement equipment	Oscilloscope
Adjustment element	RV001 of the RP-34 board
Specified value	205mVp-p

Note:

After REC Y recording current adjustment, be sure to carry out each of REC C, REC AFM and REC ATF recording current adjustments.

[Adjustment Method]

1) Adjust to 205mVp-p with RV001 of the RP-34 board.

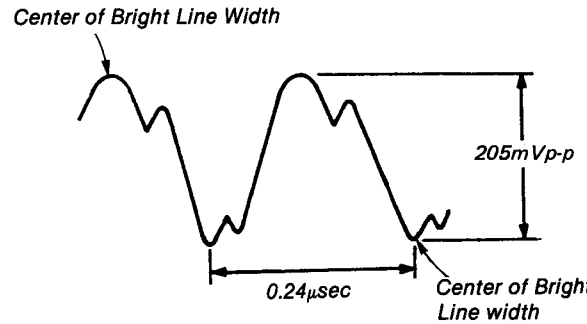


Fig. 9-24.

9-4-18. REC C Recording Current Adjustment (MV-12 Board)

Mode	RECORD
Signal	Colour bar
Measurement point	TP101 (CH1 CHECK) of the MR-8 board
Measurement equipment	Oscilloscope
Adjustment element	RV203
Specified value	35.3mVp-p

Note:

1) After REC C recording current adjustment, be sure to carry out each of REC AFM and REC ATF recording current adjustments.
2) Use MP type tape.

[Connection]

1) Connect the following two places with jumper wires:
   1. Pin ㉙ (REC Y RF) of the VY-9 board and GND
   2. CN201 pin ⑦ (PB ATF PILOT) and GND
2) Connect the following place of the AU-31 board with a jumper wire:
   1. Pin ㉙ (REC AFM) of the AU-31 board and GND

[Adjustment Method]

1) Adjust to 35.3mVp-p with RV203.

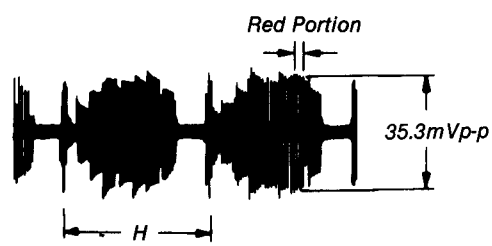


Fig. 9-25.

9-4-19. REC AFM Recording Current Adjustment (MV-12 Board)

Mode	RECORD
Signal	None
Measurement point	TP101 (CH1 CHECK) of the MR-8 board
Measurement equipment	Oscilloscope
Adjustment element	RV201
Specified value	8.0mVp-p

Notes:

1) Use MP type tape.
2) When a TP101 of the MR-8 board signal level is too low to read, connect directly through a 100Ω resistor as shown in the figure below instead of using a probe of 10:1.

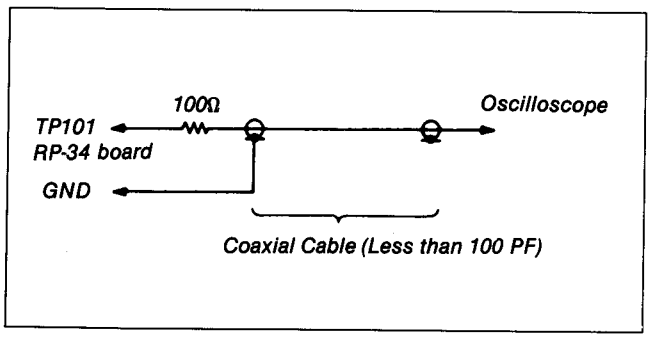


Fig. 9-26.

[Connection]

1) Connect the following two places of the MV-12 board with jumper wires:
   1. Pin ㉙ (REC Y RF) of the VY-9 board and GND
   2. CN201 pin ⑦ (PB ATF PILOT) and GND

[Adjustment Method]

1) Adjust to 8.0mVp-p with RV201 of the MV-12 board.

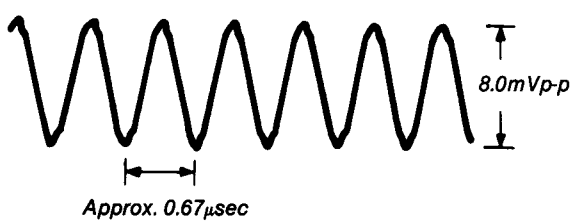


Fig. 9-27.

9-4-20. REC ATF Recording Current Adjustment (MV-12 Board)

Mode	RECORD
Signal	None
Measurement point	TP101 (CH1 CHECK) of the MR-8 board
Measurement equipment	Oscilloscope
Adjustment element	RV202
Specified value	7.0mVp-p

Note:

1) Set the SP/LP switch (S201 of the MV-12 board)
2) Use MP type tape.
3) When a TP101 of the MR-8 board signal level is too low to read, connect directly through a 100Ω resistor as shown in the figure below instead of using a probe of 10:1.

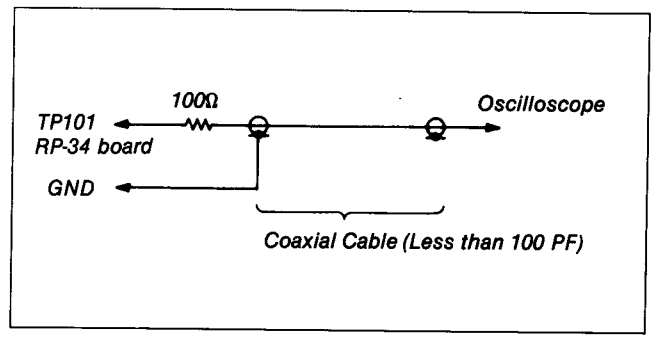


Fig. 9-28.

[Connection]

1) Connect the following place of the MV-12 board with a jumper wire:
   - Pin ㉙ (REC Y RF) of the VY-9 board and GND
2) Connect the following place of the AU-31 board with a jumper wire.
   - Pin ㉙ (REC AFM) of the AU-31 board and GND

[Adjustment Method]

1) Adjust to 7.0mVp-p with RV202.

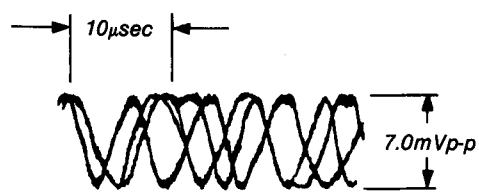


Fig. 9-29.

9-4-21. EVF Internal Display Position Adjustment (MV-12 Board)

Mode	CAMERA STANDBY
Subject	Colour bar chart standard frame
Measurement point	Confirm with the EVF screen.
Measurement enquipment	
Adjustment element	CV201
Specified value	See Fig. 9-30.

[Adjustment Method]

1) Display the colour bars for the standard picture frame.
2) Press the BACK LIGHT button to set up BACK LIGHT mode.
3) Adjust as shown in Fig. 9-30 with CV201.

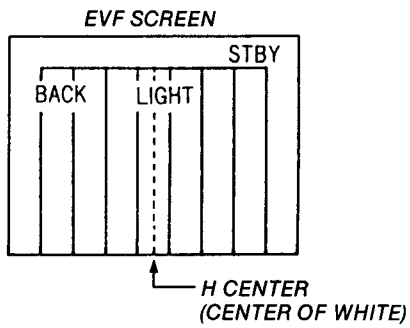


Fig. 9-30.

9-5. AUDIO SYSTEM ADJUSTMENT

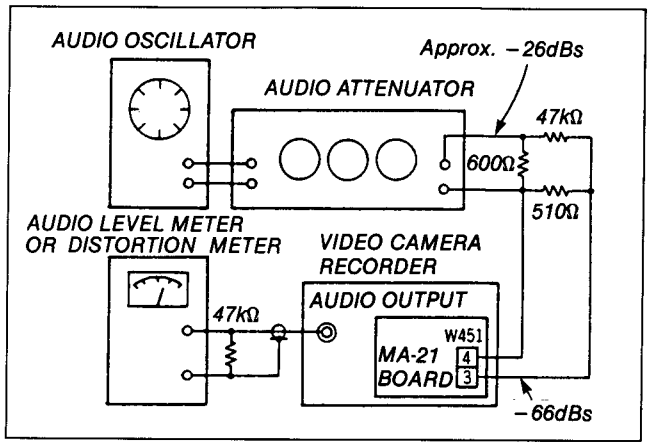


Fig. 9-31.

9-5-1. AFM Carrier Frequency Adjustment (AU-31 Board)

Mode	RECORD (SP mode)
Signal	None
Measurement point	Flat cable pin ㉙ (REC AFM) (IC401 pin ⑭)
Measurement equipment	Frequency counter
Adjustment element	RV401
Specified value	1.500 ± 0.002MHz

[Adjustment Method]

1) Adjust to 1.500 ± 0.002MHz with RV401

9-5-2. AFM Deviation Adjustment (AU-31 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP)
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Adjustment element	RV402
Specified value	−10 ± 0.2dBs

[Adjustment Method]

1) Adjust the audio output level to −10 ± 0.2dBs with RV402.

9-5-3. E-E Output Level Check

Mode	E-E
Signal	400Hz, −66dBs
Measurement point	See Fig. 3-31.
Measurement equipment	Audio level meter
Specified value	−10 ± 3dBs

[Checking Method]

1) Be sure the audio output level is −10 ± 3dBs.

9-5-4. Overall Level Characteristic Check

Mode	SELF RECORD & PLAYBACK
Signal	400Hz, −66dBs
Measurement point	See Fig. 9-31.
Measurement equipment	Audio level meter
Specified value	−10±3dBs

[Checking Method]

1) Record signals.
2) Playback recorded portions.
3) The audio output level should be −10±3dBs.

9-5-5. Overall Distortion Check

Mode	SELF RECORD & PLAYBACK
Signal	400Hz, −66dBs
Measurement point	See Fig. 9-31.
Measurement equipment	Distortion meter
Specified value	Less than 0.5%*1

[Checking Method]

1) Record signals.
2) Playback recorded portions.
3) A distortion should be less than 0.5%*1.

*1 This value applies when a distortion measuring filter (Fig. 3-32) is used (approx. 1.0% when the filter is not used).



Fig. 9-32.

9-5-6. Overall Noise Level Check

Mode	SELF RECORD & PLAYBACK
Signal	None Short-circuit with a jumper wire between W451 pins ③ and ④ (GND) of the MA-21 board.
Measurement point	See Fig. 9-31.
Measurement equipment	Audio level meter
Specified value	Less than −56dBs*2

[Checking Method]

1) Record signals.
2) Playback recorded portions.
3) A noise level should be less than −56dBs.*2

*2 This value applies when an IHF-A auditory correction filter is used.

9-6. ELECTRONIC VIEW FINDER SYSTEM ADJUSTMENT

9-6-1. Horizontal Slant Adjustment

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Specified value	See Fig. 9-33.

[Adjustment Method]

1) Adjust RV955 (BRIGHT) to provide easy-to-view brightness for the CRT.
2) Loosen the DY (Deflection Yoke) fastening band.
3) Rotate the DY to make a picture horizontal.
4) Adjust to 53.3±0.3mm a distance between the CRT surface and the rear end of the DY.
5) Tighten the DY fastening band. (Do not tighten too much.)

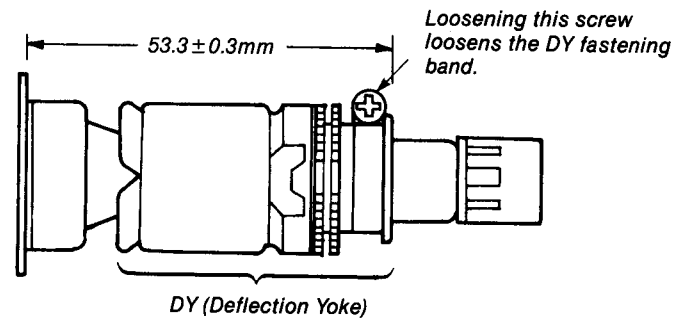
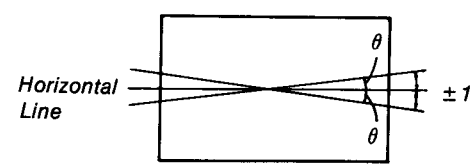


Fig. 9-33.



Specified value: A picture should be within ±1° of the horizontal line.

Fig. 9-34.

9-6-2. Centering Adjustment

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Specified value	See Fig. 9-36.

[Adjustment Method]

1) Adjust the screen uniformly in both vertical and horizontal directions with the centering magnet.

Note:

Since a centering position changes due to an effect of terrestrial magnetism, rotate 360° in the horizontal direction and adjust at the center of displacement.

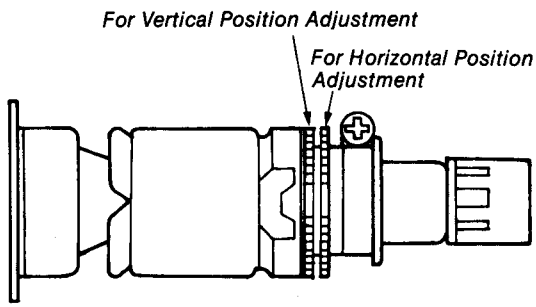


Fig. 9-35.

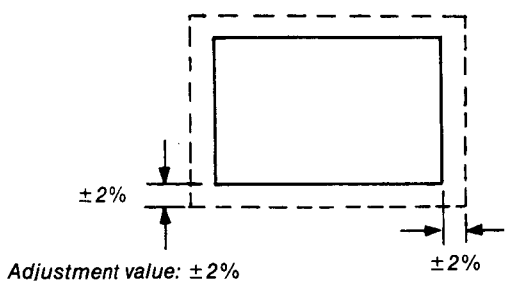


Fig. 9-36.

9-6-3. AFC Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP)
Measurement point	Pin ⑲ of IC951
Measurement equipment	Digital voltmeter or oscilloscope (DC range)
Adjustment element	RV952
Specified value	2.65±0.1Vdc

[Adjustment Method]

1) Adjust to 2.65±0.1Vdc with RV952.

9-6-4. Horizontal Amplitude Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Adjustment element	C968, 969
Specified value	6±3%

[Adjustment Method]

1) Adjust a focus with RV954.
2) Turn RV951, and conform the top and bottom of a monoscope picture to the top and bottom edges of the screen.
3) Turn RV955 to obtain a normal level of brightness.
4) Short or open the patterns (A, B) of the H-size adjusting capacitors (C968 and C969) sequentially to adjust horizontal overscanning to 6±3% (each of right and left). (See Fig. 9-37)

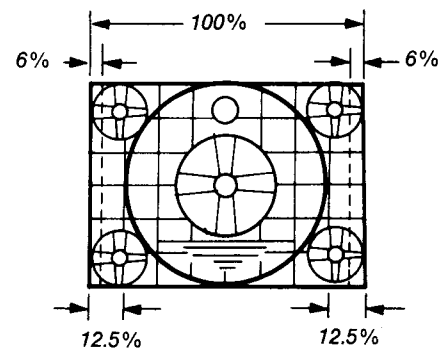
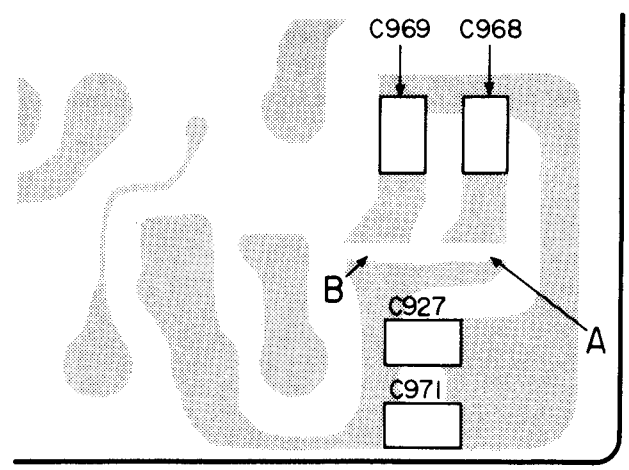


Fig. 9-37.



A	B	H Size
Open	Open	Small
Short	Open	↕
Open	Short	↕
Short	Short	Large

Fig. 9-38.

9-6-5. Vertical Amplitude Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Adjustment element	RV951
Specified value	6±3%

[Adjustment Method]

1) Adjust vertical overscanning to 6±3% (each of top and bottom) with RV951.

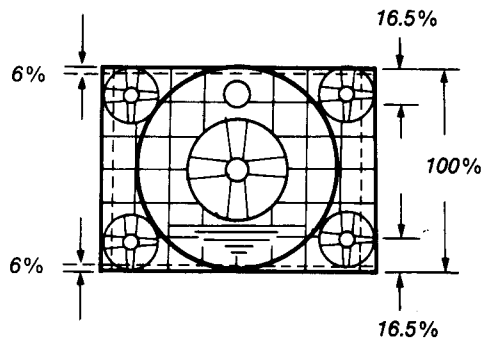


Fig. 9-39.

9-6-6. Brightness and Contrast Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Adjustment element	Brightness: RV955 Contrast: RV953

[Adjustment Method]

1) Adjust RV955 and RV953 alternately so that the light and shade of the gray scale will be correctly displayed. (The light area should not be so bright that the cross hatch inside the monoscope circle becomes dim. The shade area should not be so dark that the darkest and second darkest parts of the gray scale cannot be distinguished from each other.)

9-6-7. Focus Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Adjustment element	RV954

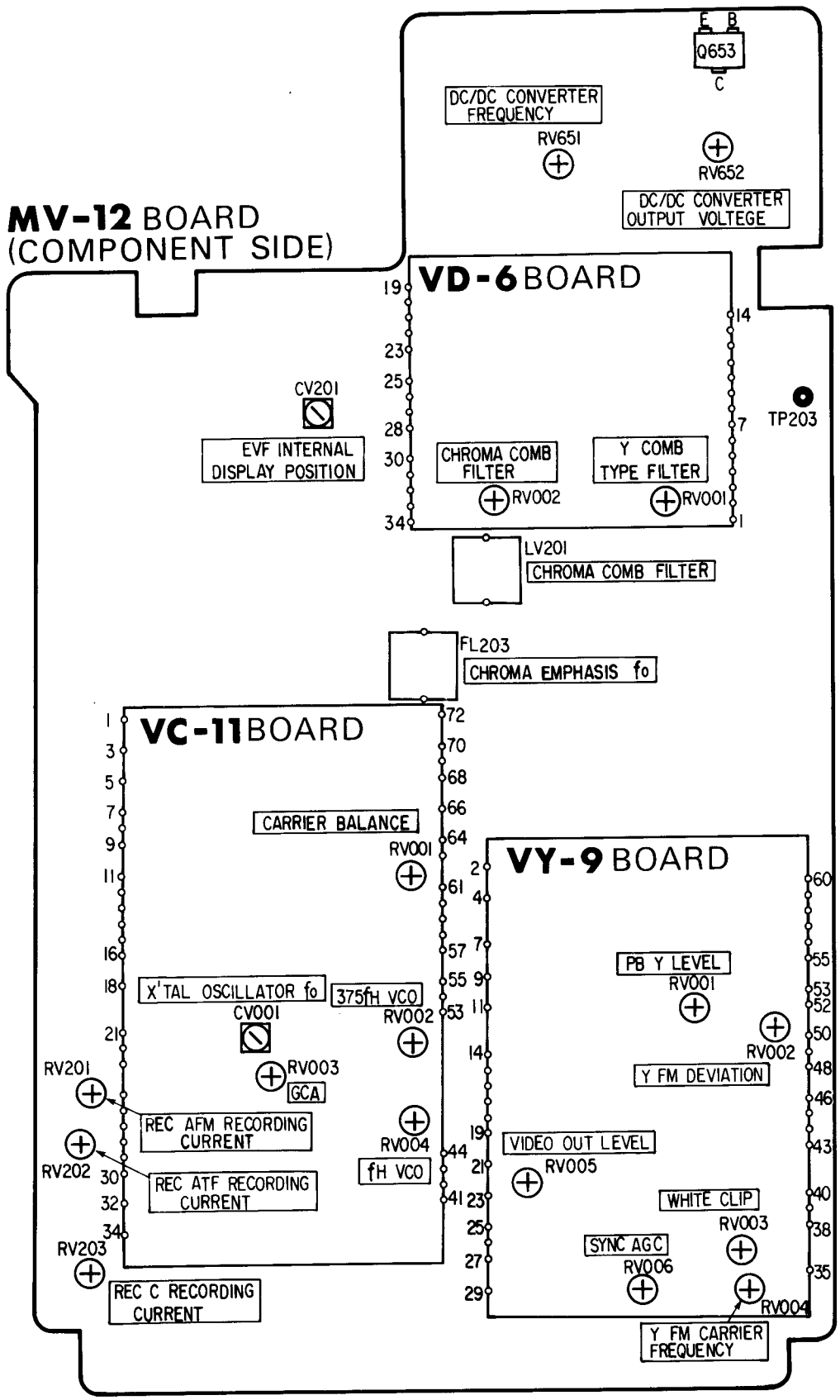
[Adjustment Method]

1) Adjust to the best focus point with RV954.

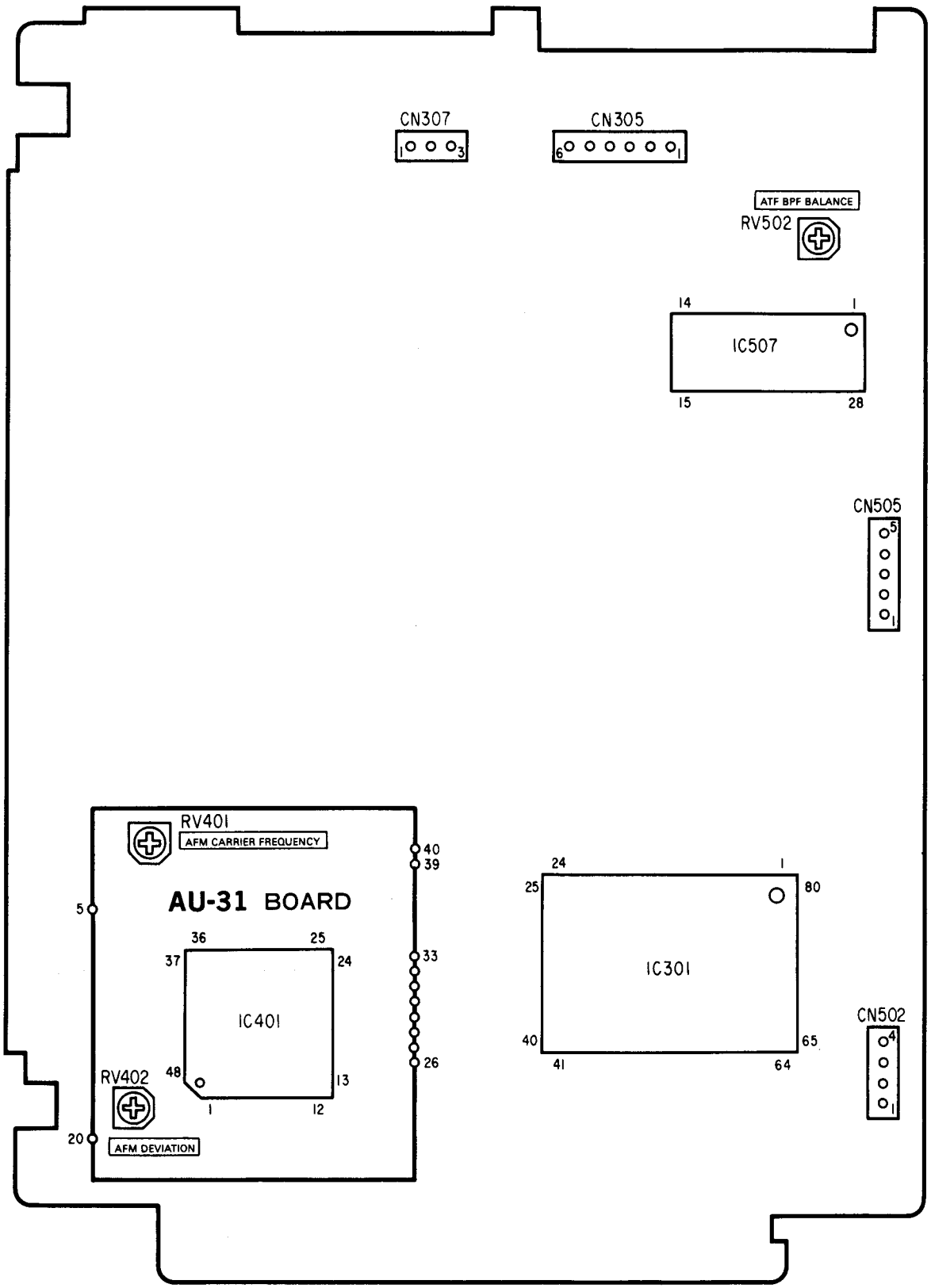
9-6-8. Horizontal and Vertical Amplitude Confirmation

Results of horizontal amplitude adjustment in 9-6-4 and vertical amplitude adjustment in 9-6-5 should meet their specified values, respectively. If not met, make readjustments. In this case, carry out both brightness and contrast adjustment in 9-6-6 and focus adjustment in 9-6-7 again.

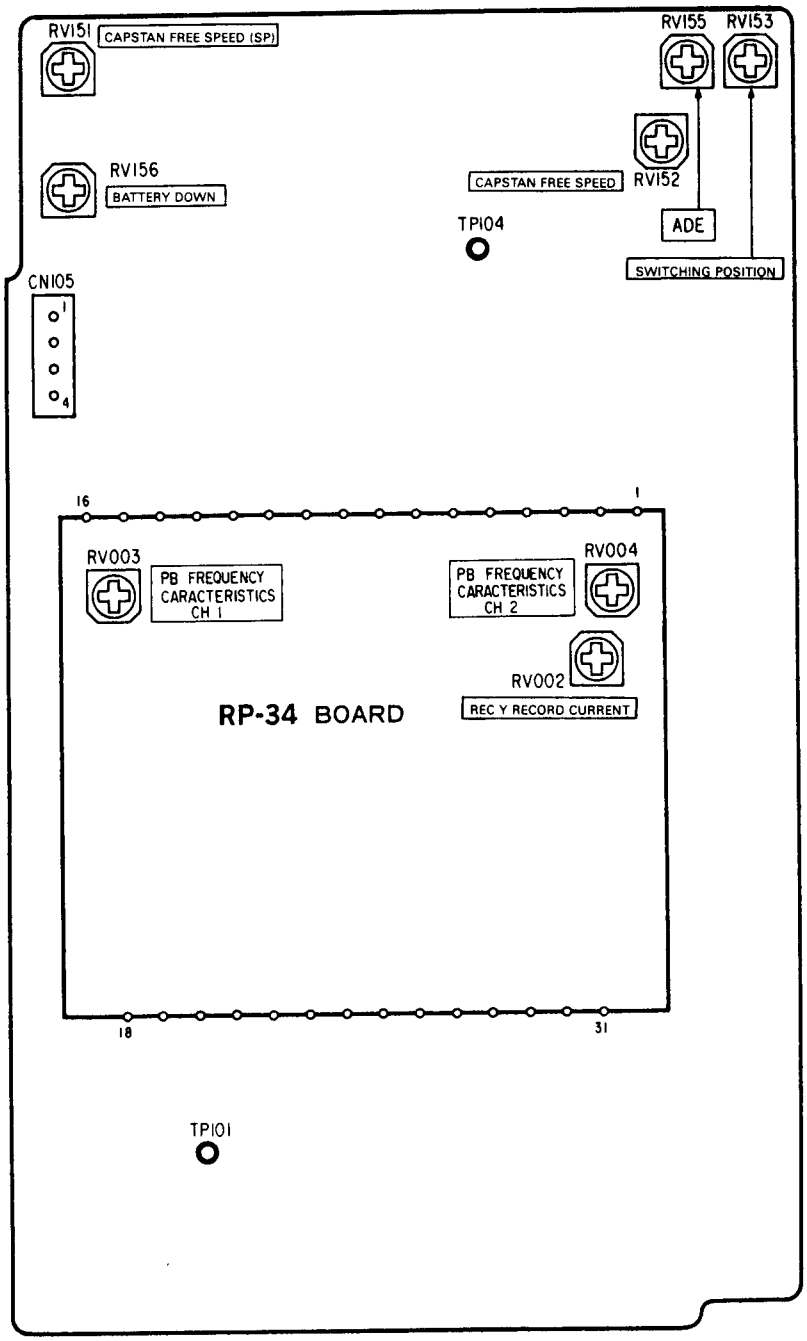
9-7. ADJUSTMENT ELEMENT LOCATION



SS-70 BOARD (COMPONENT SIDE)



MR-8 BOARD (COMPONENT SIDE)



VF-8 BOARD (COMPONENT SIDE)

